

# JOURNAL

OF THE

## AMERICAN VETERINARY MEDICAL ASSOCIATION

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**Volume CXIV**

**MARCH 1949**

**Number 864**



## AMERICAN VETERINARY SURGERY

### CELEBRATED FOR ITS LASTING LEADERSHIP

Along with the achievements seen in the work of James Law, D. E. Salmon, V. A. Moore, W. H. Dalrymple, Marion Dorset, W. B. Niles, John R. Mohler, R. H. Ransom, G. H. Hart, A. T. Peters, W. E. Cotton, Maurice C. Hall, and others too numerous to name here, there came clinicians in the field of surgery whose work also is inscribed in the general history of veterinary medicine.

Named in the order of their appearance in the records are A. Liautard, M. H. McKillin, W. L. Williams, Wm. Herbert Lowe, L. A. Merillat, T. H. Ferguson, S. J. J. Harger, J. H. Blattenberg, W. J. R. Fowler, John Devine, J. C. Flynn, J. V. Lacroix, R. R. Dykstra, O. V. Brumley, T. A. Sigler, and others no less deserving, who laid the groundwork for the techniques of the present time.

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\$7.50 per annum Foreign \$8.00; Canada \$8.00 Single Copies 75 cts. prepaid in U. S.  
Published monthly at 600 S. Michigan Ave., Chicago, Ill., by the American Veterinary Medical Association. Entered as second class matter August 10, 1932, at the Post Office at Chicago 5, Illinois, under the act of March 3, 1879. Accepted for mailing at special rate of postage provided for in Section 582, act of February 28, 1925, authorized August 10, 1932. Reproduction of any part of this publication is prohibited, unless special permission is given. Permission will be given if the purpose seems justifiable and, in signed articles, if the rights or requests of author are not violated thereby. Reprints should be ordered in advance. Prices will be quoted after publication. Please send prompt notice of change of address, giving both old and new. Advise whether the change is temporary or permanent. Address all correspondence to American Veterinary Medical Association.





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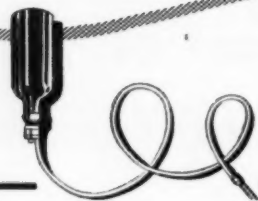
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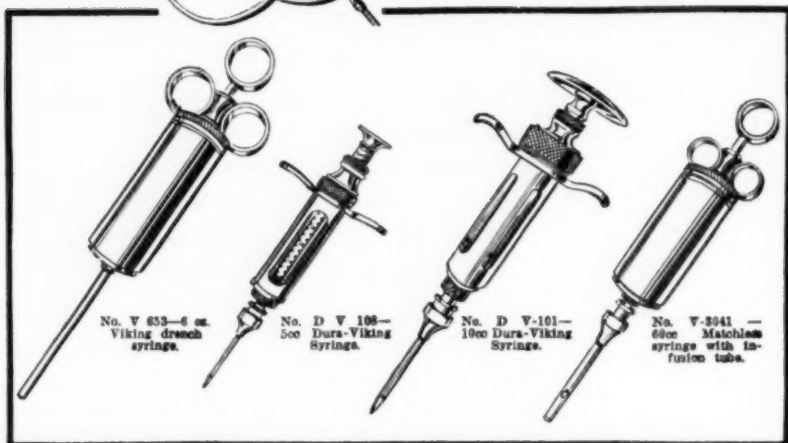


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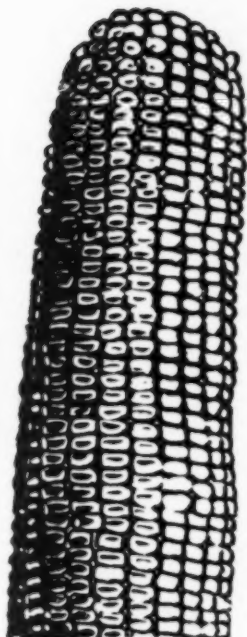
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1. Stults, A. W., and Foley, E. J.: J. Am. Vet. M. A. 113: 68 (July) 1948.

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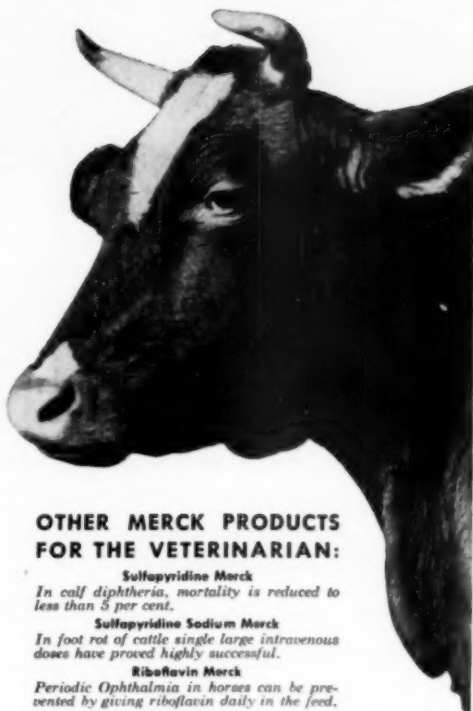
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<sup>1</sup>Chavance, J. Vet. Med. 41: (1946) 199-201

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# AVMA ☆ Report

## *Veterinary Medical Activities*

★ Executive Board Chairman W. R. Krill appeared on the program of the National Conference on Rural Health, sponsored by the American Medical Association in Chicago, on February 4 and 5.

• • •

★ Drs. C. R. Donham, of Purdue, G. W. Jensen, of the University of Illinois, and J. S. Bengston, of Chicago, are the members of an AVMA committee in charge of preparing a technical exhibit on brucellosis. Plans are progressing for the construction of the exhibit which will be shown at the 1949 annual meetings of the American Medical Association, the American Public Health Association, and the AVMA Annual Meeting in Detroit, July 11-14.

• • •

★ For hotel information and reservation for the AVMA Annual Meeting in Detroit on July 11-14, 1949, see pp. 42 and 43 in the advertising section. Early reservation of hotel accommodations is urged.

• • •

★ President L. M. Hurt recently appointed a special committee of practitioners to consider practitioner participation in the brucellosis control program, and to make recommendation as to how practitioners can be encouraged to participate more actively in the program. The committee consists of Drs. A. E. Erickson (Michigan), C. C. Franks (Iowa), O. Norling-Christensen (Illinois, representing the AVMA Executive Board), A. M. Orum (Illinois), T. L. Steenerson (Indiana), R. J. Tobola (Minnesota), and W. Wisnicky (Wisconsin).

The committee met in Chicago on January 31 with Drs. B. T. Simms and A. K. Kuttler. A complete report of their meeting will be published in the April JOURNAL.

• • •

★ Dr. C. Don Van Houweling, director of Professional Relations on the AVMA staff, attended the Farm and Home Week meetings at the University of Illinois, and the Fact-Finding Conference of the Institute of American Poultry Industries in Kansas City, Mo., during February.

• • •

★ Dr. O. Norling-Christensen, Executive Board member from District III, attended the Indiana, Illinois, and Wisconsin State Veterinary Medical Association meetings during January. At each of these meetings, Dr. Christensen reported to the members the activities of the AVMA and of the Executive Board.

• • •

★ Dr. W. G. Brock, Executive Board member from District VIII, spoke to the Louisiana Veterinary Medical Association during their 18th annual meeting on the subject of "The AVMA Executive Board and Its Functions."

• • •

★ The achievements of the veterinary profession won greater recognition in 1948 than in any previous year, clippings from newspapers and reports from radio stations show. Unprecedented numbers of newspapers, magazines, and radio stations gave space and air time to veterinary items of public interest during the past year. It is expected that even more material will be used by newspapers and radio stations during 1949.

• • •

★ President-Elect C. P. Zepp, Sr., will represent the AVMA at the 14th International Veterinary Congress in London, August 8-13, 1949.



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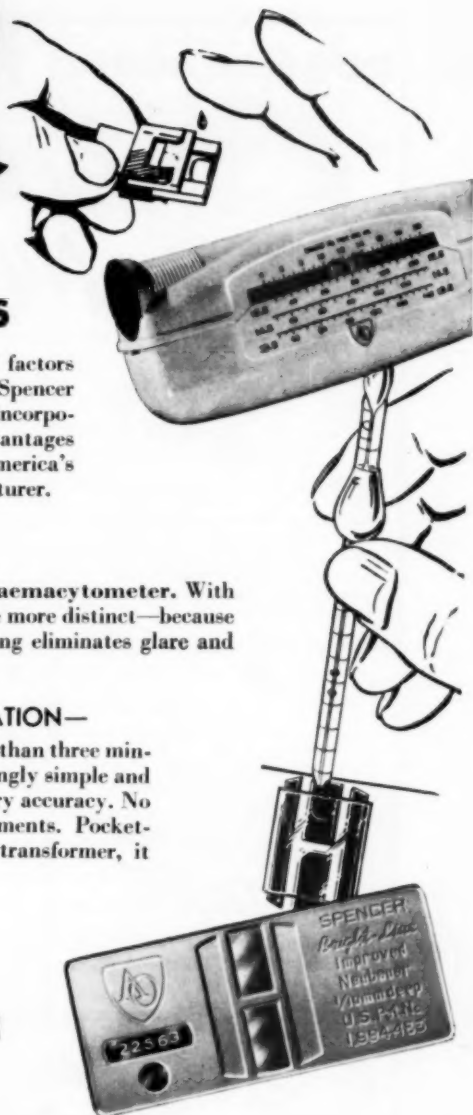
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# Journal of the American Veterinary Medical Association

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VOL. CXIV

MARCH, 1949

NO. 864

## Atomic Warfare and the Veterinary Profession

COLONEL WAYNE O. KESTER, V.C., and MAJOR EVERETT B. MILLER, V.C., U.S. Army  
*Washington, D. C.*

THIS is the second of two related papers. The first<sup>1</sup> was nontechnical and designed to give the reader a quick word picture of what atomic warfare might mean to a veterinarian, and to point out the problems which such warfare could mean to the veterinary profession.

This paper is an elementary study of the technical aspects with a view to giving the reader a broader perspective and a better understanding of the problems and why they exist. The first part is a brief summary of the general effects of the atomic bomb detonation. This is followed by a few basic precepts of the effects of the atomic bomb detonation on animals, and then, on food. Finally, an idea of the probable effects on the veterinary profession, itself, is ventured.

### GENERAL EFFECTS OF THE ATOMIC BOMB

General consideration should be given to the effects of the explosion of an atomic bomb, if only for the purpose of discrediting any belief that atomic warfare against the United States would alone cause the total and instantaneous destruction and devastation of the Nation's food and transport animal population, vital food industries, and veterinary services. This evaluation should be made in terms of magnitude, distance, and time. Because it is a strategic weapon, the choice of targets and method of employment should also be considered. A study involving these considerations would signifi-

cantly moderate the terrifying phenomena of atomic warfare into a picture of a practical approach to the several problems of concern to the veterinary profession.

The direct effects from an atomic bomb detonation that would be of immediate concern to veterinary medicine and public health may be classified in three groups: (1) blast injury or damage; (2) burning or scorching; and (3) biological effects on living animal tissue or material contaminated by radioactive substances. The first two effects—blast and thermal—are physical and are similar to those produced by any other conventional explosive-type weapon, with the exception that they are of enormous magnitude. The third effect—nuclear radiation—makes the atomic bomb detonation significantly different from the other explosive weapons. This constitutes the cause of the terror that has been so widely, and wildly, guessed at.

All three are effected within a fraction of a second or several seconds following the detonation of the atomic bomb, and the radiologic effect alone may continue for a period of several weeks or years. The destruction and devastation among personnel, animals, facilities, and services in the immediate area of the zero-point of the detonation is complete and may extend outward for several miles. A large percentage of the radiologic effect occurs within microseconds of the detonation, and the remaining small fraction of the total radiologic effect is given off by the products from the reaction of the original atomic bomb material that rise in the column of water or dust. The thermal effect, associated with the initial flash of light, comes within a fraction of a second after the detonation and may continue, but probably with lesser intensity, as the ball of fire rapidly expands to a radius of several hundred feet within a second. The heat effects from the detonation of the atomic bomb are

From the Veterinary Division, Office of the Surgeon General (Kester), and the Historical Division, Army Medical Library (Miller), Department of the Army.

Presented before the General Session, Eighty-fifth Annual Meeting, American Veterinary Medical Association, San Francisco, Calif., Aug. 16-19, 1948.

<sup>1</sup>Kester, Wayne O., and Miller, Everett B.: *Veterinary Aspects of Atomic Explosion*, J.A.V.M.A., 113, (1948): 325-329.

mainly on personnel and animals, but the greater part of the material damage is caused by the immediately occurring blast or shock wave from the bomb.

The terms "prompt radiation sickness," flash burns," and "primary shock" have been used to designate the biological effects on man as well as on animals, at the time of detonation. Secondary to the detonation, further injuries would be sustained by animals and personnel thrown about or hit by flying objects as a result of the shock or blast wave. Fires may be started which would cause additional damage to building construction and a greater number of casualties with flame burns (in contrast to flash burns).

In connection with the radiologic effect, the atomic bomb at the time of detonation can be likened to a gigantic x-ray machine emitting lethal *gamma* rays. These rays are of the same type of electromagnetic radiations which include infrared, visible, and ultraviolet light, and Roentgen rays. The infrared, visible, and ultraviolet light may be considered most important at the time of detonation in connection with the thermal effect, but the *gamma* rays are included with the radiologic effect of the atomic bomb. Large quantities of noncharged electric particles, called neutrons, are also emitted at the time of the detonation. These, together with the *alpha* and *beta* particles which are emitted, complete the medicophysicist aspect of the radiologic picture that is to be considered herein. The neutrons are actually products of the fission type breakdown of the atomic bomb material (uranium or plutonium) when detonated, and may be "captured" by animal tissue or substances with which they come in contact. These then become radioactive (i.e., neutron-induced radioactivity), and may emit *beta* particles and *gamma* rays. The fission type breakdown of the original atomic material into smaller unit atoms at the time of the detonation forms, in addition to the neutrons, so-called fission products, which then continue to undergo radioactive decay and emit *gamma* rays and *beta* particles for varying periods (from a fraction of a second to many years). (See fig. 1, 1a.)

#### RESULTS OF DIFFERENT TYPES OF DETONATIONS

The manner in which the atomic bomb may be used would cause variations in the military efficiency of the immediate blast, thermal, and radiologic effects, and prolonged radiologic hazards to personnel, animals, food, and related industries and services. This has been shown in the comparative studies of one detonation at ground level, three airbursts, and an underwater test detonation. Distance (such as altitude in the instances of the airburst) and the dampening index of air, water, or ground

mediums on moving energy would be moderating factors on the blast effect. Flash burns would not be a serious factor in an underwater detonation, although subsidiary fires could develop in the area after the detonation, due to damage to building construction and power facilities. In the airburst, the immediate radiologic effect would be serious, but residual radioactivity would be of little importance except in the center of a relatively low altitude detonation. Such an area probably could be rehabilitated within a short time.

In the ground-level and underwater detonations, the main hazard following detonation would be the deposition of large amounts of the radioactive fission products and of neutron-induced radioactive earth or salt water on the ground or water and on nearby personnel, animals, and material. A serious contamination will occur over a large area downwind, and will last for a varying period. However, unlike the ground-level and underwater detonations, the fission products, as a source of radioactivity, are not an important hazard in an airburst, because they are dissipated in the rapidly rising bomb cloud and would probably be greatly diluted and their radioactivity somewhat expended if they should shower down later at a distance (depending on wind velocity) far removed from the zeropoint of the detonation. In this connection, it is notable that the way in which an atomic bomb would be used against any chosen target may be influenced by the military situation, such as whether the area should be denied use by the populace or occupying forces for a long period, as in the instance of the ground-level or underwater detonations, or the area destroyed by a high altitude airburst because of its vital importance to the defending country. (See fig. 1, 1b and 1c.)

#### EFFECTS OF THE ATOMIC BOMB ON ANIMALS

In atomic warfare, the veterinarian will be confronted with a new disease entity—radiation sickness. The diagnosis, treatment, and prognosis of cases of blast shock, injuries, and burns among large numbers of animals near the explosion also might be of major significance, making even more complex the radiation syndrome. Relatively few cases of radiation sickness would be seen following an airburst, because the other effects of the atomic detonation, which are more far-reaching than the radiologic effects, would presumably kill many of those near the zeropoint of the detonation. However, with the possible insidious or undetected fallout of radioactive substances from the ensuing bomb cloud, this syndrome may appear among animals

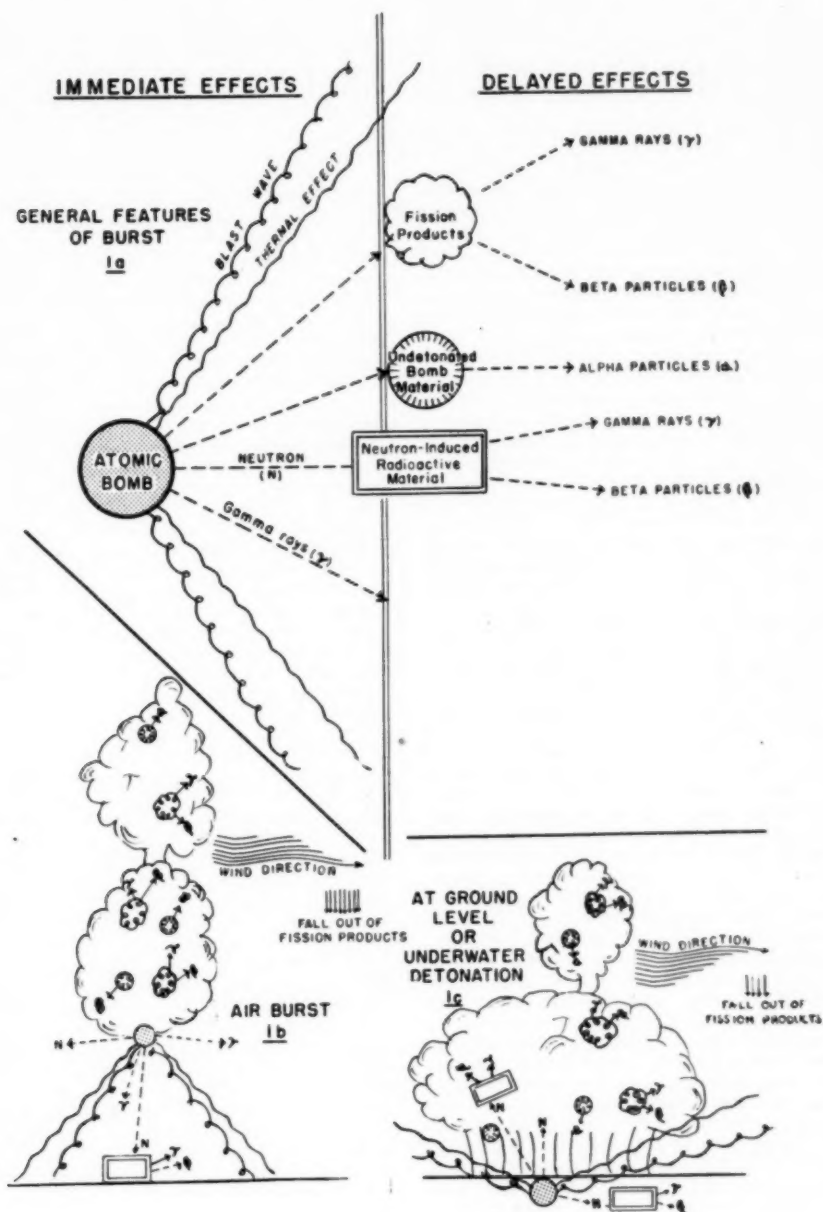


Fig. 1—Effects of different types of atomic bomb detonation.



later at some distance from the zeropoint. By the fallout of radioactive substances from an atomic bomb cloud, there may be created a chronic radiologic situation. In this connection, defense plans might trace the bomb cloud for the purpose of warning the population of its path.

In contrast to the situation that may be created by an airburst, a large number of cases of radiation sickness would be observed following a ground-level or underwater detonation. Tons of radioactive earth or water would be raised up, mushroom out as far as the pressure wave could carry them, and then descend upon anything within several miles from the zeropoint. This upsurge of earth and water might extend outward for five miles.

In military situations, the pathogenic factors in radiation sickness would be: (1) an external, total body exposure; (2) an internal exposure due to wound contamination, inhalation, or ingestion of radioactive substances; or (3) both. Cases of radiation sickness seen today are generally limited to those where a focal point of an animal receives an overdose from a therapeutic x-ray machine and offers but little assistance to the study of cases of radiation sickness that might be observed in atomic warfare.

The external radiologic hazards are caused by the *gamma* rays emitted at the time of the detonation or by the radiations from material in which radioactivity is induced at the time of the detonation by the neutrons or by the fission products of the atomic bomb material. The neutrons, which are emitted only at the time of the detonation, are themselves of negligible medical importance as an external hazard. The *alpha* and *beta* particles present no serious external hazards because they are almost entirely stopped by the intact skin. However, the *alpha* and *beta* particles, the latter occurring more commonly, are internally dangerous. They are emitted from neutron-induced radioactive substances or from fission products of the atomic bomb material which may be ingested, inhaled, or contaminate skin wounds.

Qualitatively, the *alpha* particles are believed to be a hundred times more injurious than *beta* particles, and both are more destructive than *gamma* rays; neutrons are also more potent biologically than *gamma* rays (about five times). Although the *gamma* rays have a much lesser degree of biological action, their ability to penetrate and reach the deep tissues make them a particularly serious hazard. The fundamental effect of any type of radiation, however, is believed to be similar—all producing destructive ionization in protoplasm.

The mechanism of the ionizing tissue injury, however, is not known.

The more primitive body cells (such as those of lymphatic tissue, bone marrow, white blood cells, and reproductive cells) are more radiosensitive than connective tissue and muscle and the highly specialized nerve cells. This variation of radiation sensitivity among tissues also is extended to include a species variation—the rabbit being more resistant than the mouse, and the rat more than the pig.

The previous article<sup>1</sup> described the symptoms of radiation sickness and pointed out that animals exposed at Bikini developed much the same signs and symptoms of radiation sickness as were noted in the Japanese survivors at Hiroshima and Nagasaki. Blood changes seem to be the best index to the diagnosis of radiation sickness. Following severe exposure, there is a prompt decrease in the total lymphocyte count that is detectable within one to three days. Other blood changes appear but seem to be less certain, and to date have not been studied sufficiently to evaluate their diagnostic value. The classical laboratory methods and procedures now used in clinical medicine are of little diagnostic value for detecting radiation sickness, with the exception of the cellular blood count.

More recently, rutin has been suggested as a promising preventive agent against the uncontrolled hemorrhages following radiologic exposure. It strengthens the walls of blood vessels.

The civilian as well as the military veterinarian should be able to evaluate the effects of an atomic bomb detonation on transport and food animals. With the destruction of the gasoline and oil supply for motor transport likely, animals, such as draft and pack horses and mules that might escape the explosion, could be used to transport relief supplies, evacuate personnel, and patrol the devastated areas. In this connection, it is notable that animals and personnel are more resistant to the physical damaging effects (blast and heat) of an explosion than are material and building construction. However, no information is available to indicate how long such animals could be used after exposure to the radiologic effects of the atomic bomb detonation, after envelopment in a radioactive dust cloud or water spray immediately following detonation, or after feeding and drinking in an exposed or contaminated area. It would be immediately necessary, however, to provide care and treatment to these animals, many of which would be superficially injured by the explosion, or show flame burns. Further, any strategic attack aimed at the immobilization of motor and other ground trans-

port would create a more widespread demand for the veterinarian, to insure the efficiency of animal transport. If these animals should be required to work in danger areas, the World War II type of gas mask for horses is believed adequate to prevent the inhalation of radioactive dust particles. The gas mask would minimize the chance of internal radiation but could be used only a limited period because its filter would concentrate sufficient amounts of radioactive material to become dangerous.

Plans for the disposition of food animals which may be concentrated in large numbers in stockyards, barns or pastures, and feedlots exposed to an atomic bomb detonation or contaminated by a radioactive dust cloud or water spray should also be studied. Since these units of the Nation's food industry are—with few but outstanding exceptions—small and widely scattered, their natural dispersion is a means of protecting the food animal and animal food industries. Animals near the zeropoint, which are dead or die shortly after the detonation, should be disposed of locally, because even under normal conditions they provide a sanitary hazard and would constitute a serious health hazard to personnel in a devastated area should the carcasses be used for food, as might happen during food shortages. Disposal could probably be accomplished by deep burial. The burning of carcasses of animals dead or dying on account of radiation sickness, however, does not eliminate the sources of radioactivity in or on the carcass.

Probably more animals in the area would survive than would be killed outright. These survivors would present a serious problem. After an airburst, some of the animals showing flame burns or superficial injuries or wounds caused by the explosion, would, presumably, be safe for immediate slaughter because the unseen radiologic effects of the detonation are limited to a radial distance considerably within the much larger zones of observable blast and thermal effects on material and building construction. Grazing on land and inhaling dust particles which are radioactive may subsequently cause these animals to become acutely or chronically ill. There is no evidence available to forecast whether food animals exposed to the radiologic effects of an atomic bomb should be slaughtered immediately and utilized for human consumption, or should be held for observation for a reasonable period. Secondary pathologic changes, including those of emaciation, may be observed within several days following exposure, and thus would constitute cause for inspectors to reject such carcasses as

unfit for human consumption. In this connection, the question arises whether it is economically sound or at all possible to continue the feeding of growing stock, dairy cows, or poultry, and breeding stock. It may be presumed that the traffic of animals out of an area should be controlled.

The knowledge of radiologic injury to the reproductive systems of animal breeding stock is economically important to the owner as well as its effect on the future of breeding operations. Temporary or permanent sterility can readily be produced by the radiologic effects of the atomic bomb. Little is known, however, of what genetic effects can be expected. Actually, almost all mutations are dead or die shortly after birth and those surviving are generally self-limiting. Since the genetic character of such mutations is generally recessive (in contrast to dominance), the changes may not become noticeable until some time after the first few generations when several recessive genetic characters may be combined.

#### EFFECTS OF THE ATOMIC BOMB ON FOOD

The food stockpiles in the area of an atomic bomb detonation (airburst, ground-level, or underwater) and those contaminated by the precipitation of radioactive substances from a bomb cloud will present major problems to the military veterinarian particularly, and to others engaged in food control and sanitation. Although such stockpiles would constitute external hazards to food inspection and handling personnel, a more complex problem would be the possible use of radioactive foods by great numbers of consumer personnel, who would become exposed to the threat of the more serious internal radiation. Once radioactive substances have been taken up by the body, no means or method known to present-day medical science would effect their elimination from the body. Thus, the impact of the veterinary medical responsibility lies in the prevention of internal radiation hazards and, less so, in the control of external radiation hazards.

It should be assumed that all food found near the zeropoint of an atomic bomb detonation is dangerous to human and animal health. Since both blast and thermal effects of the detonation are more extant than the radiologic effect, such an area may be roughly outlined by gross observation of the extent of these devastating forces—all food within such an area being considered generally dangerous until proved otherwise. The radioactivity in food elements that is induced by neutrons emitted at the time of detonation is probably negligible because the neutron capture is relatively small and



the neutron-induced radioactivity in the many elements of food is expended within a relatively short time. Some foods may be more radioactively dangerous than others, depending on their sodium, calcium, phosphorous, or other element content. Notably, the food itself may not be seriously radioactive, but certain materials used for packing and packaging the food may have considerable induced radioactivity unrelated to the food.

Most likely, however, the food stockpiles may be contaminated with radioactive substances deposited by the dust cloud or water spray or later by the precipitation from an atomic bomb cloud. These deposited radioactive substances would emit *alpha* and *beta* radiation which, though not able to penetrate the present-day commercial packing and packaging materials, would be ever-present to be dangerously contaminating to unwrapped food; they would also emit *gamma* rays which are capable of penetrating all except very thick or specially selected materials. The radioactivity of some of these deposited substances is almost endless. The removal of such substances is now generally recognized as impracticable, if not impossible. Possibly foods, canned or otherwise, with an external covering, could be removed from the original containers for consumption if expert care were taken to avoid contamination and the food was then proved safe by special radiologic detection inspections. Some variances of radiologic hazards would probably occur among foods, dependent on the nature of the construction materials used in the building of open air piles, canvas-covered stockpiles, dry storage warehouses, or cold storage plants.

Proper safeguards must also be initiated in respect to food utensils and containers, particularly when personnel are to be rationed in the area. These may become contaminated when food from sources outside of the affected area are used—this hazard may easily be overlooked. The traffic of food from the affected area should be prohibited until inspected and found safe.

#### EFFECTS OF THE ATOMIC BOMB ON THE VETERINARY SERVICE

One other problem in connection with defense planning against atomic warfare concerns the organization and logistics of both the military and the civil veterinary services of an area which may be the target of an atomic bomb. Against no other type of warfare is there a need for local civilian defense planning to include a survey of the probable relief demands in adjacent areas, as well as those of the community wherein

such relief plans are made. The attack may be so devastating throughout an adjacent area, which may also suffer a total loss of its veterinary organization, as to require nearby unaffected communities to volunteer an all-out relief program. A total loss of a civil veterinary service in a community is less likely, however, than of the medical service which has built large hospital centers in metropolitan areas. On the other hand, the natural dispersion of veterinary practitioners to the rural communities constitutes a well-recognized feature of defense of the veterinary service against atomic warfare. Possibly, the truly medical demands might be so great in an area that veterinary personnel, facilities, equipment, and drugs might be used for other than veterinary purposes. These factors should be included in local defense planning against atomic warfare by the veterinary profession.

#### DETECTION OF RADIOLOGIC HAZARDS

An important aspect of defense planning is knowledge of the means and methods to be used to detect the prolonged radiologic hazards which exist near the zeropoint of the detonation of an atomic bomb or at a distance following the fallout of radioactive substances from an atomic bomb cloud. It is important that the area be defined so that the traffic of personnel, animals, and material into and out of the danger area can be controlled. Radiologic survey teams may be specially formed for operations from a central national or other defense organization, military as well as civilian. These teams might be equipped with various types of radiologic detection and measurement instruments, sometimes referred to as monitoring devices. Some are simple filmlike packets, such as are carried in the pockets of hospital x-ray technicians, or like a hollow tube equipped with a lens through which the movements of an indicator needle can be observed. Others are more complete and generally impractical for individual use—i.e., the Geiger-Muller counter. These are necessary to establish the danger area, and to permit the deployment and operations of disaster relief teams in such areas with a relative degree of safety, i.e., without unnecessary or over-exposure to radiologic hazards.

#### SUMMARY

It is believed the foregoing and previous studies affirm that those aspects of the atomic bomb which are of importance to the veterinarian are not difficult to understand. On the contrary, the veterinarian

with his previous knowledge of the effect of x-ray burn, and blast injury is basically trained and experienced to grasp the full significance and limitations of atomic warfare. It is evident also that, in event of atomic warfare, the veterinary profession will constitute one of the Nation's bulwarks—both in its traditional rôle of safeguarding the livestock and food-producing industries and in the public health field of conserving and safeguarding existing food supplies. Actually, a veterinarian does not have to be a specialist, but he should devote a few moments to the study of atomic warfare in its relation to animals, to food and related industries, as well as to the veterinary service in his locality. There is need for each veterinarian to give the matter continuing thought as it may affect his own activity, and there is great need for further research in an effort to solve the many serious problems yet unanswered.

### Soviet Genetics

The principles of genetics accepted by the non-Soviet scientific world are not compatible with the canons of Marxism. The ever resourceful Soviet government has been fostering for some time a substitute doctrine called Michurinism. The adherents of Michurin, harking back about a hundred years, hold that "...new characteristics and properties arising in plants, animals, and microorganisms under the influence of the conditions of life, the environment, can be transmitted to the progeny." This is hailed as the materialistic, practical view of heredity and far superior to the idealistic, metaphysical theory of cytogenetics founded by those "foreign reactionary biologists, Weismann, Mendel, and Morgan."

(This ethical inversion, in which "ideal" is a term of opprobrium and the "practical" becomes the acme of human aspiration, is not confined to Soviet thought.)

The chief proponent of Michurinism, T. D. Lysenko, has become the president of the Soviet Academy of Agricultural Science. At the last session of the academy, July 31 to Aug. 7, 1948, he made a speech "On the Situation in Biological Science"\* in which he demanded the adoption of Michurinism by Soviet biologists. The academy, stimulated by the announcement that the speech had been approved by the Central Committee of the Communist Party, passed a resolution acclaiming Michurinism. This resolution contained the encouraging information that many educational institutions were still teaching the science of genetics in defiance of Lysenko.

\*Published in English by the International Publishing Co., New York.

The author of the present article climbs on the bandwagon with the application of Michurinism to veterinary medicine: If acquired characteristics are inherited, then the most important factor in the improvement of existing breeds and the development of new breeds is the care and feeding of the animals and the prevention of disease.

Microbiology is cited as a broad field for the application of Michurinism. The alteration of strains of organisms by controlled culture is advanced as evidence for the doctrine.

The author's summary (S. N. Muromtsev: On the Results of the August Session of the Lenin All-Union Academy of Agricultural Science. *Veterinariya*, 25, (Sept., 1948): 3-5) follows: "It is the sacred (sic) duty of the workers of veterinary science to be in the front ranks of the workers of biological science and agricultural technology in the further study, use, and development of the Michurin doctrine, and in the exposure and destruction of the metaphysical, reactionary position of Mendelism-Morganism."—R. E. HABEL.

### Brucellosis Control in Sweden

About 160,000 farms are now involved in a state-supported, but voluntary, campaign to control brucellosis in cattle (*Skand. Vet.-tidskr.*, 36, June, 1948). Of 15,491 infected herds, 52 per cent are now free of the disease. Infection is detected by use of the ABR (abortus Bang ring) test on pooled specimens of milk. Blood tests are then made on cattle that have the disease, as shown by the ABR test. On farms where there are infected cattle, a program of gradual elimination is carried out, but cows are isolated during parturition and any material suspected of being a source of infection, such as the fetal membranes, are hygienically disposed of. Calf-hood vaccination is practiced on the large farms. Infected animals are gradually removed from the herd. Eight provinces are now free of brucellosis.—A. G. KARLSON.

*Bacterial Inhibition by Trichomonads.*—In cultures, *Trichomonas foetus* elaborates some substance or substances which inhibit the growth of *Salmonella pullorum*, *Corynebacterium renale*, and *Salmonella schottmuelleri*, according to a report in the *Journal of Parasitology* (34, April, 1948: 114-118) by Dorothy J. Hitchcock, Michigan State College.

Thyroprotein is now available commercially for animal feeding.

## The Veterinarian in a Rural Public Health Program

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I CONSIDER this a unique occasion, that I, a medical man trained to treat the ills of human beings, should be offered the opportunity to speak at the opening of a magnificent building dedicated to preserving the health and curing the ills of animals. It is another indication of the growing realization by both of our professions that we have a mutual interdependence, a mutual aim, and a mutual destiny. Both professions have the ultimate purpose of achieving a fuller and better life for our people. We are beginning to realize that we cannot hope to keep our people well if our animals are not also kept at the highest possible level of health. For too many years, our two professions have been too far apart. If there has not been actual distrust and antipathy, then, at least, there has not been sufficient comradeship and coöperation between us. Let us rejoice that there is now developing a mutual respect and coöperation between the medical and veterinary professions.

In no field of medicine is the close relationship between the two professions more evident than in public health or preventive medicine. National economy is dependent on the status of the basic, primary industry of agriculture. Topsoil fertility may be the lifeblood of agriculture, but animal husbandry is one of its principal nutrients. The problems of animal feeding, breeding, and disease control are irrevocably linked to human health and welfare. One does not need to be a student of history to recall how directly the health of animals has affected the health and well-being of human beings. Consider a few isolated instances; for instance, the goats on the island of Malta infected with *Brucella melitensis* and, subsequently, the outbreaks of Malta fever among the British soldiers, giving us our first knowledge of brucellosis. Consider how closely the incidence of bovine tuberculosis in human beings has paralleled the efforts of the veterinarian in attacking the problem among cattle. There is an ever increasing realization in all scientific fields pertaining to health that the many fields of

knowledge, experience, and endeavor must unite in order that all members of the community may have good health. Public health is neither the sole responsibility nor the sole prerogative of the physician, nurse, veterinarian, dentist, sanitary engineer, nutritionist, industrial hygienist, sanitarian, or the laboratory worker. Rather, good public health can be attained only by the full effort and coöperation of all these, and many other, groups. Each has an important part to play, and it is only by concerted and unremitting effort that we can hope to make worth-while advances.

Until recently, neither the officials concerned with public health administration nor those responsible for the training of veterinarians have appreciated the potential contribution of veterinary medicine to public health. There has been a definite lack of public health interest on the part of the veterinary profession. The broadening of the curriculum in this and similar institutions to include more hours of preventive medicine and the provision of postgraduate work for veterinarians in schools of public health have been important forward steps. Of equal importance is the growing realization by public health officials that the veterinarian has a valuable contribution to make to the health of the community that can be made by no other person.

In the most general terms, the chief contribution that the veterinarian can make to public health is in the field of food control. The term "food control" is used in its broadest sense to cover food production, processing, and handling. By virtue of his training, the veterinarian is the individual best able to cope with these problems.

In outlining the contribution the veterinarian can make in a rural public health program, the opinions expressed are my own. They are based on personal experience in Ontario. However, the general principles are applicable to all rural areas in Canada. The employment of veterinarians in rural health units is a comparatively recent development and opinions may differ as to the exact limits of their field of endeavor. However, no thinking public health administrator today will deny that the veterinarian is an essential figure in a well-balanced health unit.

Director and medical officer of health, Halton County Health Unit, Milton, Ont.

Presented at the veterinary conference and dedication of the West Wing, Ontario Veterinary College, Guelph, July 8, 1948.

I do not propose to deal with the rôle of the veterinarian at either the federal or provincial level. For many years, he has had an active part in programs sponsored by the Dominion government. At the provincial level in Ontario, public health officials have been slow to grasp the value of the veterinarian. It is only in recent years that the veterinarian has been accorded the responsibility due him. Now, a veterinarian heads the division of food control in the Provincial Department of Health.

#### HISTORY OF RURAL PUBLIC HEALTH SERVICES IN ONTARIO

The major cities of Ontario, for many years, have had public health services manned by trained personnel on a full-time basis. In contrast, the rural areas in Ontario have had little or no service. All personnel has been part-time and usually has lacked training. The medical officer of health was appointed by each local municipality and was usually miserably paid. He had to make a living by practice in the same community. This, as a rule, did not lead to good public health practices. The sanitary services were usually the responsibility of an untrained individual who was probably also dog catcher, truant officer, and local policeman. Nursing service varied widely from none to a fairly efficient, comprehensive coverage. In most cases, it was confined to school children. In 1944, an amendment to the Public Health Act made possible the provision of public health services in rural areas equal to that in cities. By this legislation, the Provincial Department of Health paid 50 per cent of the cost of health units in rural areas if certain conditions were met. The employees were to be full time, specially trained for their jobs, and they were expected to provide a well-balanced public health program. These units could be made up of a county, part of a county, a county and a city, or a group of counties. Today, there are examples of all of these, with about 25 health units already in operation and many more waiting to open when trained personnel is available.

My own county of Halton might be used as an example of the set-up of rural health units in Ontario. We have a population of 33,000 evenly divided between rural and urban, and operate on a budget of \$1.25 per capita. In the area are five towns and four townships. Our staff consists of a medical director, a supervisor of nurses, six staff nurses, two sanitary inspectors, and clerical workers; all have received special training. The director, in addition to a medical degree, holds a diploma in public health; nurses have had a year of training in public health nursing; and the sanitary inspectors have had correspondence

courses arranged by the Canadian Public Health Association. Our program is entirely preventive and is concerned with the health of all age groups. We are the sole public health authority and are responsible to a board of health and, through this, to the county council and the various municipalities.

Soon after our program started on Sept. 1, 1947, it became apparent that there were several staff deficiencies. A dentist trained in public health was needed. We did not lack dental facilities, but the public needed to be educated to proper dental public health procedures. Another obvious lack was personnel trained in food control. The sanitary inspectors were adequate for routine inspection work but, when faced with a technical problem in food control, their training was inadequate. Such problems as an outbreak of food poisoning, mastitis in a herd, advice on communicable disease control in animals, inspection of carcasses, etc., require a man trained in veterinary medicine.

The director of the health unit in adjoining Peel County came to the same conclusion at about the same time—that a veterinarian was needed in his program. Together, we have a population of about 65,000 and we felt that this would keep a veterinarian usefully employed in his own field. At the present, we are negotiating with an applicant for this position.

#### THE VETERINARIAN IN A RURAL HEALTH UNIT

What qualifications are required for the position of veterinarian in a rural health unit? In the first place, he must be a graduate of recognized schools of veterinary medicine and public health; preferably a fairly recent graduate with a few years of experience in general practice. He must have a pleasing personality, since he will deal with many people in the community, and must be imbued with the preventive philosophy as contrasted to purely curative medicine. You may question the necessity of a public health degree. Preventive medicine is practiced to a greater or lesser degree in all branches of human and veterinary medicine. However, those who devote their full time to this specialty require more training than it is possible to give in undergraduate teaching. No one can hope to give leadership without adequate preparation. Even though undergraduate courses are placing more and more emphasis on preventive medicine, there is still the need for postgraduate training to coördinate and direct our knowledge. Probably, one of the most important functions of the postgraduate course is to develop to the fullest ex-



tent the proper attitude toward public health practice. We must develop in these men the primary truth that preventive medicine is largely public health education, that public health is not concerned with punishment, but has as its prime purpose the helping of the entire community to better health.

What are we prepared to offer this man? We feel the minimum salary should be not less than \$3,500 per year with an adequate car allowance and with provision for substantial rise in salary.

What would we expect this man to contribute? His work might be divided into three categories: (1) supervision, (2) consultation, and (3) education, all of which would be preventive and would not encroach upon the field of the practicing veterinarian. We do not believe that a veterinarian should be responsible for routine inspections that can be done equally well by the sanitary inspector. Not only would it be poor use of the veterinarian's time, but it would also leave the sanitary inspector with a more restricted, less interesting job. We feel that the sanitary inspector should continue routine inspections involved in food control, but that his work would be subject to the supervision and control of the veterinarian. The veterinarian would be available for consultation, not only to the unit director and his sanitary inspectors, but also to the practicing veterinarian, to the food producer, processor, distributor, handler, and ultimate consumer. One of the most important functions of health units is the instruction of the public in the reasons for, and the need for, better health practices, with the resultant dividends that accumulate in the form of better health for the whole community. Public health can go only as far as the people want it to go. Conversely, the general public is eager to know more about measures for the protection and betterment of health and will co-operate fully when shown the reasons. In the matter of food control, no one possesses the qualifications necessary for this task except the public-health-trained veterinarian.

In the field of environmental sanitation, the veterinarian fills a great need, particularly with reference to milk production, slaughtering, and meat processing. In my county, we have more than 100 producers supplying dairies in the county. Since we are close to two major cities, Toronto and Hamilton, the larger producers supply milk to the cities and are inspected by the staffs of these health departments. Most of our producers are smaller and have less facili-

ties. They would welcome the help and advice which can be given by a veterinarian. I do not consider that the actual processing of milk in the dairy is a matter for the veterinarian; rather, it is an engineering problem already adequately supervised by sanitary engineers from the Provincial Department of Health. However, the veterinarian would be an effective liaison officer between the primary producer, the processor, and the health department in the production of a safe, potable, and nutritious milk supply.

Slaughtering and meat processing in a rural community bear little relation to that of a large city, where these procedures are under the direct control of trained veterinarians. In the rural area, each small butcher, in addition to the supplies he obtains from the large packer, usually has his own small slaughterhouse, the primitive conditions of which must be seen to be believed. There is little or no supervision; many have never been inspected; refrigeration is lacking; and sanitary disposal of offal is usually completely absent. One would not expect to raise these establishments to the same degree of efficiency as the large packer but one could hope to make their products safe for human consumption.

The veterinarian has an important liaison function in public health in regard to agricultural programs for the control of tuberculosis, brucellosis, and mastitis. In my county, active programs are under way in tuberculin testing of cattle and calfhood vaccination against brucellosis, which are both important to the health of our people, but we need a public-health-trained veterinarian to see that they achieve the maximum results. For example, there is at present no organized machinery to ensure the testing of persons on farms using raw milk from herds that are found to contain reactors to tuberculin. The economic value of testing human beings may not be as obvious as it is in cattle, but apparently the fact that cattle are tested primarily as a protection for man has not been kept in mind. There is definitely a two-way approach in the work of the public health veterinarian: animal health and nutrition as it affects human health and nutrition. Certainly, the County Federation of Agriculture, the county agricultural agent, the young farmers' clubs, the women's institutes, and the agricultural industry as a whole would welcome the contribution made by him.

The veterinarian is well equipped to deal with the special problems that arise in food control, such as consumption of meat from

diseased or abnormal animals. With his training in bacteriology and immunology, he can cope with outbreaks of food poisoning. The sanitary inspector does not have the background of knowledge to enable him to deal with these special problems; neither does he have knowledge concerning animal diseases transmissible to man.

The veterinarian should take an active part in public health education and in the development and implementing of a complete well-rounded program. Public health education is the keystone of any good health unit. Not the least important part of this education is the teaching of good food control practices from the primary producer, through the processor, distributor, and food handler to the consumer. It is obvious that the approaches to this problem are varied and numerous. In several centers, schools for food handlers have been organized by the veterinarian in charge of food control for the Provincial Department of Health, where the fundamentals and techniques for proper food handling have been taught. We propose to hold meetings with milk producers and processors on essential features in the production of clean milk. There is a need for in-service training of sanitary inspectors in the fundamentals of food control. In these and many other aspects of education, the veterinarian is the man best fitted to handle the teaching.

Public health is a matter of team work between all branches: the physician, the veterinarian, the public health nurse, the dentist, the sanitary inspector, the laboratory worker, and many others. There need be no conflict between the various groups; each contributes to a well-rounded, well-balanced public health program.

#### SUMMARY

The addition of a veterinarian to the staff of a rural health unit is in no sense revolutionary; rather, it is a natural evolution as are so many other developments in this field. Slowly, the need has become apparent, and, gradually, it is being filled. The veterinarian has a real contribution to make in rural public health. I consider that his field lies primarily in food control, and that he can make a three-fold contribution in this field by supervision, consultation, and education. No rural health unit will be complete until a veterinarian is included on its staff. Just as it is inevitable that part-time health services will be replaced by full-time services, so no full-time rural health department will be complete until its food control is placed under the direction

of a public-health-trained veterinarian. To the veterinary graduate who wishes to render a life of service to his community, to have an interesting career, and an opportunity for teaching, a career in public health should be seriously considered.

#### Our Passing Civilization

According to a scholarly article in *The Atlantic Monthly* last year, the hope of man's survival on earth lies in the Tibetans, the Eskimos, the Canadians, and the African Negritos, who are sheltered against the contaminations of a way of life that is rapidly destroying itself. Says the author, in effect, the earth will have to be repopulated, through future ages, from these escapees of wars, threats of wars, and atomic bombs.

But, from the lookout point of the veterinarian who sees the potentiality of the boneless creatures of the earth in his everyday life, the salvage of man's heritage is not even that bright. Great reptiles and fishes inhabited the earth some 80,000,000 years ago, and flying insects came some 250,000,000 years before that. The giant mammals held forth for an inconceivably long period. Man seems to have come in about 100,000 years B. C. and took command of living things only about 6,000 to 10,000 years ago. So on the long run, with science and invention, atomic bombs and everything, the sojourn of the two-legged mammal is but a passing biological accident of little consequence; hardly worth mentioning by the paleontologists of the distant future.

Man has other boned creatures licked to a frazzle and is putting up a good fight against the boneless parasites, but he doesn't seem to have been given the knack of saving himself from his own species.

Q Fever is recognized as an air-borne infection, particularly among workers at the Public Health Institute at Beltsville, Md., and at the National Institute of Health. . . . In one area in California (Artesia), 10 per cent of all cows in some herds reacted to the complement fixation test, and as many as one half of the herds had some reactors. . . . Half of the veterinarians in California, who have been tested, react to the Q fever test.—W. L. Jellison, Ph.D., Montana.

Every clinician is engaged in research.—H. E. Kingman, D.V.M., Wyoming.

# Q Fever—A Brief Survey of the Problem

(Continued from February JOURNAL)

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## EXPERIMENTAL STUDIES OF Q FEVER IN CATTLE

Studies of Q fever in experimentally inoculated cattle were initiated at the Rocky Mountain Laboratory in mid-1947.

The only previous attempt to infect cattle was reported in Australia in 1942.<sup>22</sup> In the Australian experiment, 2 female calves (7 and 8 months old, respectively) were inoculated subcutaneously with infectious guinea-pig spleen and liver tissue. Both had mild febrile reaction on the third day. One was sacrificed on the 4th day and *C. burneti* was recovered from its spleen and liver. It was also recovered from a 4th-day blood specimen of the other calf. The blood of the latter was found to contain specific antibodies beginning the 11th day. Of larval ticks (*Boophilus microplus*) placed in the ears of this calf just before and at the time of inoculation, those in one ear became infected while those in the other ear did not.

The initial studies at the Rocky Mountain Laboratory involved 4 heifers, inoculated intranasally, intravenously, *via* the digestive tract (by feeding contaminated bran), and *via* the vagina, respectively. Successive specimens of blood, nasal washings, feces, and urine from the animals were tested for infectiousness in guinea pigs with negative results, except that five-day and nine-day urine from the heifer inoculated *via* the vagina were positive.

*Experiment 1.*—In November, 1947, 2 milk cows (3-year-old and 7-year-old Jerseys) were inoculated *via* the udder, the former *via* the milk duct of one quarter, the latter *via* the milk duct of one quarter, *via* the mammary gland of another, while a third quarter was inoculated subcutaneously. Each inoculated quarter of these cows received a minimum of 5,000,000 guinea-pig infectious doses of a saline suspension of a yolk-sac culture of the original Nine Mile strain. Milk from the inoculated and noninoculated quarters was tested daily for the first ten days, then at varying intervals of a few days until the 48th day, and thereafter mostly at weekly intervals. Only milk from inoculated quarters became infectious. In the cow inoculated in one quarter only, *via* the milk duct, the first milk of this quarter was definitely infectious through the 34th day and strip-

pings through the 48th day. Subsequent tests to date, more than 250 days after inoculation, have been negative. In the cow inoculated *via* three quarters, the first milk of the quarter inoculated by the teat canal was infectious for only seventeen days, that of the one inoculated *via* the gland was still infectious on the 202nd day, while that from the quarter inoculated subcutaneously has remained noninfectious. The complement fixation test has been positive since about the end of the first week. Tests of successive specimens of nasal secretions, blood, feces, and urine taken from these cows during the first month after inoculation were consistently negative.

*Experiment 2.*—In January, 1948, a milk cow was inoculated *via* the uterus with 10 cc. of a suspension of a yolk-sac culture of a California strain (recovered from milk), containing at least 1,000,000 infectious doses per cubic centimeter, mixed with 1 cc. of seminal fluid. Pooled first-milk samples from all four quarters were tested for infectiousness first at two-day intervals and subsequently twice a week with occasional longer intervals. The following samples have been positive: six- and ten-day, all but 1 (which was valueless) of 10 samples taken from the 18th to the 47th day, 14 of 19 taken from the 51st to the 114th day, and all of 12 samples taken from the 117th to the 160th day. The results of later tests are not yet available. Samples from the separate quarters taken on various dates and stored in CO<sub>2</sub> refrigerator have been thawed and tested, and it has thus been determined that only the left front quarter was infected. Blood and urine specimens were tested at the same intervals as the milk samples through the 79th day. Tests of the former were consistently negative, while those of urine were positive on the 2nd, 3rd, 5th, 7th, and 8th days. Complement-fixing antibodies appeared in the cow's serum on the 9th day and are still present. It appears likely that the infectiousness of the urine resulted from contamination with inoculum which drained from the cervix into the vagina. It is problematical whether infection in the left front quarter resulted from the inoculum introduced into the cervix or by contam-



ination of the teat orifice with infectious urine.

**Experiment 3.**—An experiment, planned primarily to obtain information on the symptomatology and pathology of Q fever in cattle, was initiated in April, 1948. Each of 4 milk cows was inoculated via the milk ducts of the two left quarters of the udder, each quarter receiving a minimum of 5,000,000,000 guinea-pig infectious doses of a yolk-sac culture of the same California strain used in the previous experiment. Two control cows received an equivalent amount of normal yolk-sac material. The test cows were sacrificed and were autopsied on the 5th, 11th, 22nd, and 63rd days, respectively, and specimens of numerous tissues were preserved for histopathologic study. Observations on these cows have been as follows: (1) the blood of all 4 cows was infectious on two or more of the first five days (later tests all negative); (2) the milk of each of the inoculated quarters of each cow was infectious from the first day to the date of sacrifice, or to such date as the tests were completed; (3) the systemic reaction was of brief duration preceding and accompanying an acute phase of mastitis and was characterized by marked pyrexia, slight serous nasal and lacrimal discharges, moderate to severe depression, partial inappetence, infrequent rumination and shallow rumen movements, moderate tachycardia, and a moderate polypnea accompanied only by a definite increase in vesicular murmur; (4) the disease produced temporary metabolic changes in the activity of the mammary gland as far as the constituents of milk that were measured were concerned; (5) the cows, except for the one sacrificed on the 5th day, all became positive serologically; (6) on autopsy, gross lesions were confined chiefly to the mammary gland and regional lymph nodes; (7) by titration of milk in guinea pigs, the milk was shown to be infective in dilutions of at least  $10^{-5}$  and  $10^{-4}$  on the 2nd and 7th day postinoculation, respectively, and thereafter at five-day intervals was infective only at  $10^{-1}$ ; and (8) in the cow sacrificed on the 63rd day, the milk of the uninoculated right rear quarter became infectious on the 7th day and remained infectious until the cow was sacrificed.

**Experiment 4.**—Another experiment was initiated to determine if unweaned calves would become infected by ingesting infected milk. Beginning April 27, infectious milk from the cows used in the experiment just described was fed to 2 male calves, one 3 weeks old, the other 3 months. Each received about 6 liters a day. The 3-month-old calf became febrile on the 13th day and

was sacrificed the next day, while still febrile. *C. burneti* was recovered from its blood on the 4th, 6th, and 12th days and from its feces on the 8th day. Of the calf tissues thus far tested, it has been recovered only from the prescapular lymph gland and from the abomasum. The 3-week-old calf has, to date, exhibited no clinical symptoms. *C. burneti* was recovered from its blood on the 4th and 13th days and from its feces on the 2nd, 6th, 10th, and 14th days. Other early fecal specimens may have been positive, but most tests were rendered valueless by intercurrent infections. Urine specimens were consistently negative for both calves.

**Experiment 5.**—In still another experiment started last March, 1 cc. of yolk-sac culture material containing at least 100,000,000 guinea-pig infectious doses (Nine Mile strain) was instilled into one eye of a heifer. Interval blood specimens taken through the 30th day were noninfectious for guinea pigs. The only evidence suggestive of infection was that complement-fixing antibodies appeared in the blood toward the end of the first week and were still present on the 94th day.

**Experiment 6.**—An experiment has recently been initiated in which an attempt is being made to transmit Q fever to cows by the spinose ear tick, *Otobius megnini*. To date, none of the tests being made regularly three times a week for the presence of *C. burneti* in the blood and milk of these cows has been completed. However, it appears possible that 1 of the 2 cows used in this experiment may have become infected, as complement-fixing antibodies have been present in its blood since the 20th day after infected ticks were placed in its ear.

#### THE EPIZOOTIOLOGY OF Q FEVER IN NATURE AND IN DOMESTIC ANIMALS

The word "nature" as used with respect to animals in this discussion refers to animal life other than domestic animals and man.

Little is known concerning what wild animals become naturally infected. As is later noted, spontaneous infection in bandicoots and in gerbils has been demonstrated in Australia and in Morocco, respectively. Positive agglutination and complement fixation tests have suggested spontaneous infection in other species, and various small mammals and birds have been found susceptible experimentally.

Thus far, ticks are the only animal ectoparasites from which *C. burneti* has been recovered. As later noted in the review of

literature, six and possibly eight species have been found spontaneously infected in the United States, one in Australia, and at least three in Morocco. Other species have been found to be experimental vectors, while in still more species the Rickettsia persists but apparently cannot be transmitted by biting. The few attempts which have been made to transmit infection with blood-sucking parasites of other groups (fleas, mosquitoes) have all been negative. Therefore, on the basis of present evidence, the hypothesis seems justified that Q fever is a disease of certain native (wild) animals and that ticks may be the most important agency for transferring the Rickettsia from animal to animal. However, the possibility of some additional means of infection other than transmission by ectoparasites appears far from unlikely. In this connection, one must keep in mind that experience with laboratory animals suggests: (1) that the eyes, nostrils, digestive tract, and the abraded or even the unabraded skin may be avenues of infection; (2) that the Rickettsia remains highly infectious for long periods in dry tick feces, in dry blood, and probably in other dried materials, and that dried infectious materials can contaminate the ground, inanimate objects, burrows, nests, etc., and can be in the air as dust particles; (3) that tissues of animals dead from Q fever, or of live animals in which the Rickettsia has persisted following recovery, may be a source of infection for scavenger and predaceous animals; (4) that it is possible, as in the case of sheep, goats, and cattle, that milk from infected animals of some species may be infectious for their nursing young; and (5) that there is at least a possibility that infected male animals may sometimes be able to transmit infection to females during copulation and perhaps vice versa.

Information relative to the natural source or sources of infection in domestic animals is equally vague. Ticks are suspected in Australia (*Ixodes holocyclus*)<sup>12</sup> and Morocco (*Hyalomma* spp.),<sup>13</sup> and certainly appear to be a likely source in the United States where three — *Dermacentor andersoni*,<sup>1</sup> *D. occidentalis*,<sup>15</sup> and *Amblyomma americanum*<sup>16</sup> — of our six species definitely known to be naturally infected are parasites of the larger domestic animals and dogs. *Otobius megnini* is not included in this group because it has not yet been shown to be spontaneously infected in nature.

Experimentally, sheep and goats have been infected by inoculation into the lungs, subcutaneous inoculation, *via* the conjunctiva, and by nasal instillation;<sup>17</sup> horses and mules *via* the conjunctiva;<sup>18</sup> dogs by subcutaneous and intraperitoneal routes;<sup>19</sup> domestic chickens by intravenous inoculation; lactating cows *via* the udder; a helper *via* the conjunctiva; and unweaned calves by feeding infected milk. Camels have been reported as infected but the route of inoculation was not given.<sup>20</sup>

On the other hand, spontaneous infection in domestic animals has been definitely reported only in cattle, sheep, and goats. Since Q fever is a disease resident in nature, spontaneous infection in these animals has two aspects: (1) how domestic animals become infected from nature, and (2) after infection has been introduced into a herd, under what conditions and by what means does it spread from animal to animal.

The problem of how and to what extent infections are spread among a herd of any of the larger domestic animals after being introduced is also obscure. Admittedly, the factors involved are likely to vary with the degree of concentration of animals in any individual herd, and with local or regional variations in the natural or the man-made conditions that may be concerned in transmission. For example, the problem appears likely to be different in a herd of range cattle than in one of dairy cattle. And among dairy cattle, it again appears likely that the problem may be consequentially different in the usual farm dairy herd than in a dairy herd maintained under the conditions existing in the milkshed area of southern California, that is, with a mass concentration of animals in a very small area. It certainly seems logical to assume that the opportunities for within-herd transmission become greater with a mass concentration of animals. This hypothesis carries the assumption, as suggested with respect to the disease in nature, that among other domestic animals there are other possible sources of infection besides ticks. However, the recent apparently successful experimental transmission to cows by the spinose ear tick<sup>13</sup> indicates that the tick factor, so far as this species is concerned, is still a possible one in any area where this tick occurs, no matter how concentrated the dairy industry.

#### Q FEVER IN MAN

Q fever infections in man are usually acute, ranging from mild to severe, but may be inapparent. The incubation period may be as long as thirty days, but ordinarily is about two weeks. Onset is usually sudden. The course of infection is char-

acterized by some combination of the following symptoms and physical findings: fever, frontal headache, chills, chilly sensations, photophobia, malaise, muscular aching, anorexia, nuchal pain, chest pain (usually lateral), pneumonitis similar to that in atypical or virus pneumonia, slight cough, nausea and vomiting, sweating, and insomnia. A rash is rarely present. The duration of the febrile period is usually from five to fifteen days. In severe cases, the temperature may reach 105 F. or 106 F., and there may be definite râles, pulmonary consolidation, stupor, disorientation, cyanosis, and blood-streaked sputum. The pulse rate is usually somewhat low in relation to the fever. In most cases, the blood cell counts are within normal limits. Symptoms commonly watched for as diagnostically suggestive are: intense headache, retro-ocular pain, and fever without a corresponding increase in pulse rate. The case fatality rate is less than 1 per cent. Complications are infrequent. Those reported are thrombophlebitis, pleurisy, orchitis, and epididymitis. Transient paraplegia following recovery has been observed in 1 case. Clinically, the disease has been frequently confused with influenza, atypical or virus pneumonia, the common cold, sinusitis, and bronchitis.

Diagnosis can be definitely made only in the laboratory, either by the recovery of infection in guinea pigs injected with the patient's blood or sputum, and sometimes with urine, or by demonstrating complement-fixing antibodies in the blood. In order to be certain that complement-fixing antibodies are indicative of a present rather than a past infection, it is desirable that a rising antibody titer be shown in successive blood specimens.

As with both wild and domestic animals, the sources of infection and the avenues by which the Rickettsia may be introduced into the body with resultant infection are obscure.

In Greece, it is claimed that the milk of goats and sheep is an important source.<sup>20</sup> The results of the studies being made in southern California<sup>21</sup> and at the Rocky Mountain Laboratory<sup>22</sup> suggest that raw milk of cows may be a factor. The slaughterhouse outbreaks in Australia<sup>2</sup> and in the United States,<sup>23, 24</sup> and again the southern California studies<sup>25</sup> (and unpublished data), indicate that contact with cows, and perhaps with their tissues, is important. The evidence of air-borne infection in laboratory workers is convincing, and in Australia it has been suggested that the highly infectious feces of infected ticks, borne as dust in the air, has been to some extent responsible for infection in slaughterhouse workers.<sup>26</sup> The tick *I. holocyclus* is a suggested Australian vector.<sup>27</sup>

In the United States, three of the six species of ticks known to be spontaneously infected frequently bite man. In view of the ease with which these ticks transmit the Rickettsia to laboratory animals, it appears difficult to believe that they do not, at least occasionally, transmit it to man, yet there is not one instance of proved tick transmission.\*

It appears probable that there are other possible sources in nature from which man can occasionally become infected. Although Caminopetros<sup>28</sup> claims that nurses and physicians attending patients in Greece have become infected and mentions man-to-man transfer of infection by infectious sputum (no supporting evidence given), man-to-man transmission cannot be accepted as proved. The recent occurrence<sup>13</sup> of several cases in laundry employees who handled soiled towels and other items from the Rocky Mountain Laboratory offers strong circumstantial evidence that handling contaminated, inanimate material can result in infection.

#### CONCLUSIONS

Q fever is a disease of nature communicable to domestic animals and man, which has an extensive and possibly world-wide distribution. Definite information is meager relative to the mechanism of its natural maintenance, the means by which it is transmitted from nature to domestic animals and from both nature and domestic animals to man, and the means of maintenance and spread among herds of the larger domestic animals after introduction. As a problem affecting the health of domestic animals and man in the United States, it is a challenge to the veterinary and medical professions. Its solution appears unlikely without (1) intensive epizootologic studies carried on with a full comprehension of the probability that the epizootologic factors involved vary considerably in local and regional areas, and (2) intensive laboratory studies of the disease in domestic animals.

#### SUMMARY

Present information on Q fever in each of the countries in which it is known or suspected to be endemic is briefly summarized with respect to (1) the spontaneous occurrence of the disease in wild animals, in domestic animals, and in man; (2) the spontaneous occurrence of *Coxiella burnetii* in ticks; and (3) experimental studies on various phases of the problem.

\*There have been two instances of possible transmission by *Dermacentor andersoni*.<sup>29, 30</sup>

Other subjects discussed are: Q fever in California, observations on experimentally infected cattle, the epizootiology of the disease in nature and in domestic animals, and the disease in man.

#### DISCUSSION

CHAIRMAN BAUM: Thank you very much, Dr. Parker. Reference was made to Dr. R. J. Huebner. Will you give us a moment, Dr. Huebner?

DR. R. J. HUEBNER: We have been studying Q fever for fifteen months in southern California, and have limited our studies to infections in man and in cattle. They appear to be related. The agent of Q fever has the growth requirements of virus. It is filterable, resistant to heat, and it raises an entirely new question in the field of veterinary science and public health, and particularly sanitation. I think the whole field of sanitation must be reviewed in terms of viruses. It only requires going to our hospitals and tallying the different kinds of diseases there, and the number of virus infections.

It is quite a challenge. Where are these viruses coming from, and how are we going to determine that? This is a major problem for research today, including that in the veterinary field. Our sanitation practices are based at present upon our bacteriologic examinations. That doesn't mean much in terms of viruses.

If Dr. Merchant had taken 1,000 specimens of milk from southern California, and put them in guinea pigs, and if he had the means of identifying the infection, he would have found that a hundred of those specimens of milk would have contained Q fever.

We have recovered another virus agent in milk. We don't know what it is yet, but we think there is the possibility of viruses other than Q fever growing in the udder of a cow. It is an entirely new field to start working on.

What rôle do foods play? What rôle does our butter supply play in the dissemination of virus diseases? That is something we won't know about until we start looking at them as potential mediums of spread of virus diseases.

Now, as far as milk is concerned as a source of infection in southern California, we thought that was the biggest and most important public health problem we had when we were first confronted with infection in udders. Our findings indicate it certainly is a factor in the transmission to other cows as well as to man. Just exactly what rôle it plays, we don't know as yet. We know that 30 per cent of our cases in southern California use raw milk. That is considerably more than the percentage of persons in the area who use raw milk. However, assuming that raw milk can be a source of infection, how did the other 70 per cent get it.

We find that a great majority of the remainder of the cases have another factor in common—they are associated with cattle by reason of residence or occupation. There is something besides the use of raw milk in the dissemination of Q fever, and we have to determine what it is.

We do not have definite evidence yet that man can get Q fever from drinking raw milk, but in surveying 2,000 people, about one-third of whom used raw milk, we found that 1 of every 10 of those individuals have anti-bodies for Q fever. We believe that is a high rate; but we do know that you can be infected without having severe clinical symptoms.

How many of these 1 out of every 10 persons actually undergo severe infection, we don't know, but we hope to find that out. Pasteurized milk may play some rôle in the spread of the disease and perhaps in producing immunity to the disease.

We do not know how cows get Q fever but we do know that cows in many dairies have ticks. However, in one dairy with 150 infected cows, we looked at all the animals—1,000 cows—and did not find a

tick. Yet there are new infections occurring all the time.

Dr. Parker has shown that it is possible that infection of the cow can be produced via the lacteal duct and maybe that is the way it does happen. That is what we want to find out. There is no evidence from the field available yet on that point. We are studying cows intensively even before they freshen, and we hope to find out when they become infected, and in finding out when, we may learn how.

As far as calves are concerned, 3 to 5 per cent of the calves in southern California possess antibodies. Whether or not these are always the result of infection we doubt considerably, because we find that calves born to positive cows have antibodies at birth. There is a good chance that antibodies are not related to infection in calves.

However, the fact that the calves ingesting infected milk in the laboratory do excrete the organism in their feces suggests that it may happen in nature also because a great deal of milk is fed to calves.

There are other problems that need to be investigated. Sheep and goats are a problem in southern California, but most of the investigation going on in these species is being done in the northern part of the state where sheep and goats are more common than in southern California.

The question is: How intensively are we going to work on this problem? How big a problem is it for the veterinary and the medical professions?

We have observed cows that have come into southern California uninfected, as far as we can tell, many of which became infected within six months, indicating that this infection in the bovine species is one that can be transmitted with considerable ease, and that may become a statewide problem in a short time.

Thank you. (Applause)

CHAIRMAN BAUM: I wish the time permitted the introduction of many of the other workers on the subject of Q fever, but I am sure you understand that we are running short of time.

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### Distomiasis in Danish Cattle

To date, no attempt has been made to evaluate the economic importance of distomiasis in Danish cattle.

These results cited herein are derived from observations on cattle killed at the public slaughterhouse of Graasten from 1943 through 1947. The economic loss has been estimated on the basis of the price paid in Denmark for livers in August, 1948 (Danish kroner 2.70 per kg.).

A total of 21,509 cattle were killed, and of these, 2,336 (10.86%) harbored liver flukes.

Careful weighing of condemned livers and parts of livers from 400 animals suffering from distomiasis showed that, on an average, 5.06 kg. (84.52%) of livers harboring liver flukes were rejected as unfit for human consumption. From this, it can be calculated that the average loss on each slaughtered animal was 0.55 kg. of liver, and that the total loss of livers from the 21,509 head slaughtered was 11,829.95 kg. The economic loss was 31,940.87 Danish kroner (nearly \$6,654) or 1.49 kroner for each animal killed in this period; an average of 13.67 kroner on each animal suffering from distomiasis. This is the loss in liver value only; to this must be

added an unknown loss because of reduced yield when the real loss, due to the disease, is calculated.

As only a part of the cattle killed in the public slaughterhouse of Graasten originate from farms situated nearby, only a general estimate of the frequency of the disease in the southern part of Jutland can be made. Of a total of 9,035 adult cattle killed in 1946 and 1947, 5,600 were from farms in the neighborhood of Graasten. The remaining 3,435 came from other parts of Denmark. Of the animals delivered from the surrounding communities, 719 (12.83%) were suffering from distomiasis, whereas only 245 (7.14%) of the animals from other parts of Denmark showed evidence of the disease. Although these figures are too small to permit definite conclusions, they suggest that distomiasis appears with greater frequency in cattle from the southern part of Jutland than in those from other parts of this peninsula.

The survey shows that distomiasis is a common disease in Danish cattle and causes a considerable loss due to the condemnation of large amounts of liver tissue.—J. Egehoj, chief of inspecting veterinarians, public slaughterhouse, Graasten, Denmark.

### Why Farmers Shy Away from Purebred Livestock

Many more scrub bulls than purebred bulls are being used on farms today, mainly because the breed associations charged with promoting the purebred business have "talked themselves out of the average farmer's price class," according to Mr. Charles E. Snyder, editor of the *Chicago Daily Drovers Journal*.

The purebred promoters have flaunted reports and pictures of bulls that bring \$25,000 and up at the auction block being maintained in luxurious surroundings that connote pampering by millionaires. Mr. Snyder told the AVMA JOURNAL, in commenting further on the purebred situation. Practical farmers, he said, are discouraged by high-price talk, and added that close to 85 per cent of the publicity indulged in by the breed people deals with prices—prices that give an erroneous impression of the cost of a purebred start.

If the breed promoters would cite the proved values of owning good animals, plus the fact that it takes only a few hundred dollars extra (not thousands) to buy into the purebred circle, many more farmers would become interested, Mr. Snyder believes.

# SURGERY & OBSTETRICS

AND PROBLEMS OF BREEDING

## A Bacteriologic Survey of the Reproductive Tract of Infertile Cows

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ONE OF THE major concerns of the livestock man and the veterinarian is the reproductive capacity of the dairy cow. Many animals are disposed of annually because of infertility, which may be either temporary or permanent. The problem to the livestock man is entirely one of economics and the expense may involve treatment or maintenance of the animals in a nonproductive state for long periods while the difficulty is being corrected. In either case, while the cost is not cataclysmic, as in highly fatal epizootics, it is insidious and constant enough to cause much concern.

Many of the causes of infertility have been studied using various techniques and methods. One of the common disorders—chronic metritis or endometritis—has not been studied adequately, especially as to etiology and effect on fertility. Such conditions as brucellosis, trichomoniasis, and vibronic infections are quite well known and, as they constitute a group of specific infections, these conditions are not considered in this work. Herds or animals showing any of the three last named conditions were not considered appropriate for this study.

### LITERATURE

Hallman's<sup>1</sup> studies of diseased reproductive organs of cattle indicate that one of the common, yet more difficult, conditions to diagnose is an endometritis, a condition in which there are accumulations of inflammatory cells, predominantly lymphocytes, in the tunica propria in close association with the epithelium. These

accumulations can be readily observed in many sections from uteri that show little or no gross pathologic change. This cellular accumulation is quite consistent in sections from infertile animals showing only a mild chronic metritis or infertility with no other symptoms.

For many years, diphtheroid organisms have been suspected of causing much of the sporadic infertility occurring in cattle. Beaver, Boyd, and Fitch<sup>2</sup> have published data pointing to these organisms as possible causative factors and our work is in close agreement with their findings. In 1946, Roach<sup>3</sup> reported work which further indicated the importance of these organisms in reproductive disorders.

One factor that has not been adequately pursued is the possibility of conception followed by early abortion in many animals. Practitioners are in agreement that many animals showing metritis will conceive after treatment but many abort at any time from two to six months gestation. In many cases, the fetus and membranes are not found and it is often difficult to explain why an animal that has shown every evidence of gestation, even to positive rectal examination, can suddenly return to a normal or near-normal estrous cycle.

In recent years, with the development of artificial insemination, there have been quite a number of studies made on the bacterial flora of semen. Gunsalus *et al.*<sup>4</sup> and Morgan *et al.*<sup>5</sup> have published data on this problem. In each instance, there has been a large number of various diphtheroid organisms recovered. This may indicate several things: The organisms may be harmless saprophytes; they may be opportunist types causing trouble under certain favorable circumstances; or infection may be actually perpetuated by the usual insemination techniques.

Raps,<sup>6</sup> in his recently published report, has indicated little advantage in favor of the intrauterine method of insemination and such a method is undoubtedly more favorable to the establishment of infection in the uterus.

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The cervical mucus, which normally reduces the chance of bacterial passage, is eliminated as a preventive agent and, if the diphtheroid organisms often present in the prepuce of the bull and in semen are capable of causing metritis, the intrauterine method could be a factor in the spread of infection.

#### PROCEDURE

Because of the nature of the study, the possibility of gross contamination of the reproductive organs, and the possibility of barn or air contamination of the samples obtained, a great deal of difficulty was anticipated. The objective was a study of the bacterial flora of the reproductive tract of infertile animals. The method consisted of taking cultures from the cervix or cervical end of the vagina. For this purpose, sterile cotton swabs on wooden applicators were used. The swabs were placed in culture tubes, plugged, and sterilized. Glass speculums were used to introduce the swab to the desired level and cervical forceps to hold the swab during the operation.

Chlorine antiseptic solutions were used to wash the external genitalia and speculums as the specimens were secured.

The exposed swabs were then returned to the laboratory and skim milk tryptose agar plates were exposed to them by contact. The plates were incubated at 37 C. under approximately 10 per cent CO<sub>2</sub> tension for twenty-four hours. If growth occurred by this time, casein digestion and colony morphology were noted and transfers to stock mediums made; if no growth was present, the cultures were incubated under normal oxygen tension for another twenty-four hours and similar observations made.

The animals used in this study were from several sources. Part were from the Michigan State College herds and part were from herds under the care of a practitioner who was doing some artificial insemination. Most of the animals were inseminated artificially at least part of the time, some were inseminated up to ten or 12 times without conception. Several animals had a history of missing several estrous cycles following insemination and then developing a purulent metritis.

Included in the material were a few semen samples that had been used to inseminate some of the animals.

The results of the bacteriologic examination are shown in table 1.

The negative figures (table 1) include those instances in which coliform organisms and bacilli were isolated. The gram-positive rods, as listed in the table, exclude the bacilli and were predominantly Coryne-

bacterium organisms, of which six cultures were similar to *Corynebacterium bovis*, eight cultures were similar to *Corynebacterium renale* and the remaining cultures were morphologically "diphtheroid" but had a different fermentation pattern. The gram-positive coccic group contained three cultures in which chains predominated, five in which pairs predominated, while the rest showed large clusters. A study of the morphologic and fermentation patterns of the bacteria isolated indicated that many of the organisms had not been adequately

TABLE 1—Results of Bacteriologic Examination

	Neg.	Pos.	G+ rods	G+cocci
Cervical smears....	26	27	14	18
Vaginal smears....	2	5	3	3
Semen samples....	0	4	3	2

described before to allow precise identification of species.

In some instances, both diphtheroid and micrococcic organisms were isolated from one cervical smear. Comparison of the cultural results of cervical and vaginal smears from the same animal revealed that cervical smears more often furnished a pure culture of a microorganism and that the vaginal smears might contain the same organism but, occasionally, also others which are ordinarily suspected of being saprophytes.

It was not possible in every case to catalogue a microorganism as pathogenic or saprophytic, as the evidence was more or less circumstantial in nature. Sixteen of the cows showed an abnormal discharge present in the vagina and several of these were obvious cases of purulent endometritis. Other cows were normal in appearance but culture of cervical smears showed that in many cases similar organisms were present. The healthy bovine cervix has been noted to be bacteriologically sterile; only one check was made, in this series, of a cow after normal parturition and no microorganisms were found.

The semen samples had been used before being cultured, so the cultural results may not indicate the original source of organisms. In addition to the microorganisms mentioned in the table, several of the samples contained coliform organisms. The results do reveal the possibility that a bull could be the source of pathogenic organisms and also that the metabolic products of contaminants could impair the viability of the spermatozoa. These possibilities would impress one with the fact that semen samples should be collected from healthy

bulls with sanitary precautions and kept under optimum conditions until used.

### SUMMARY

A preliminary bacteriologic survey of the cervix and vagina of infertile dairy cows indicated that bacterial infection, either clinically apparent or not apparent, may be responsible for many cases of infertility.

### References

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## An Endometrial Cyst in a Spayed Bitch

On Aug. 29, 1947, a mongrel bitch, 1½ years old, was presented at our hospital for a routine oöphorectomy. She had borne a litter about three months previously.

The surgery was accomplished in the routine manner. Both ovaries were removed and the cornua were removed completely. No abnormalities were noted at the time of the operation. The patient, discharged Sept. 5, 1947, made an uneventful recovery.

On July 5, 1948, a call was received from the perturbed owner of this dog. He stated that the animal was attracting all the males in the vicinity. We urged the owner to bring in the dog for examination, which he did. We observed no symptoms of the bitch being in heat, and she had begun to show the usual development of a spayed female. We attempted no explanation to the owner. During the next two and a half weeks, we received three telephone calls that the male dogs were being attracted to his dog but that she fought them off. We offered to treat the dog with hormones, but the owner did not bring the patient in.

Six months later, Jan. 4, 1949, the owner again presented the bitch to us with the same history of its attracting the males.

This time, however, a serous vulvar discharge was present and the vulva seemed slightly enlarged. The owner also stated the dog was off its feed, restless, and in some sort of abdominal pain. The temperature was normal. We decided to perform an exploratory laparotomy to determine the cause of the difficulty.

The abdominal cavity was opened in the usual surgical manner and a thorough search made for any ovarian tissue that may have been left in the body. None was found. The body of the uterus was located by inserting a probe from the external orifice through the vagina. Upon exposing the uterine body, a large cyst, about 3 cm. in diameter, was located at the point where the cornua had been removed. About 3 cm. distal to the cyst was a dilation resembling an ampulla of a gravid uterus. The body was completely removed, including the cyst and the ampulla. Electro-cautery was used on the stump.

The patient made an uneventful recovery and the so-called symptoms of heat have disappeared.

The cyst which seemed to have been formed from a gland in the endometrium, contained a clear serous fluid.

We feel this case to be unusual in view of the cyclic symptoms, and also because of the activity of the uterus in view of the complete oöphorectomy. — Richard M. Barschak, D.V.M., Los Angeles, Calif.

## Reproductive Efficiency in Dairy Cows

Watch for protein sensitization of the vagina by egg-yolk buffer and diluent in cows that have been repeatedly bred artificially. In these cows, use ½ cc. of semen undiluted, and never use more than 1 full cc. of semen in these cows.

Artificial insemination with undiluted semen is the best method of the veterinary practitioner to get sterile cows in calf. Why can't the lay inseminator do this? Because he does not have the knowledge of the tract and because, for the most part, he is using a diluted semen.

The vaginal mucus serves the purpose of scouring the sperm as it ascends the vagina. This means that any bacteria or products of the secondary glands, foreign material, etc., will be removed, leaving the sperm entirely clean as it reaches the depth of the reproductive tract.—M. A. Emmer-son, D.V.M., Iowa.

Fertility involves much more than the ability to reproduce.—H. E. Kingman, D.V.M., Wyoming.

## Granulosa Cell Tumor of the Equine Ovary—A Case Report

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A 7-year old, bay, Thoroughbred mare was bred for the first time in England in 1946 and was subsequently pronounced in foal. Upon arrival in this country, examination revealed her to be barren. In March, 1948, the left ovary was found to

hemorrhages were seen in the cerebrum, cerebellum, and meninges, and the cranial cavity contained about 4 oz. of clotted blood.

The spleen, greatly enlarged and engorged with blood, weighed 22 kg. and measured 100 cm. in length by 55 cm. in width, and bore a scar on the surface near the apical end. Several bot larvae were attached to the stomach wall and strongyles were found in the cecum and colon. On the serosa of the small intestine, there were elevated lesions about 6 cm. high and several centimeters long, somewhat tortuous in shape. These lesions lay parallel or transverse to the long axis of the intestine and were brown-red to brownish. The right ovary was atrophic and measured 6.5 by 4.0 by 1.5 cm. Its cut surface revealed a gray, tough center and a brown, mottled, somewhat granular periphery.

The left ovary was replaced by a large ovoid tumor, weighing 2,200 Gm. and measuring 14 by 15 by 18 cm. Its exterior was smooth and covered with serous membrane which was deflected along one border. Parallel vessels from one edge of the mass



—AIP Neg. 207096-1

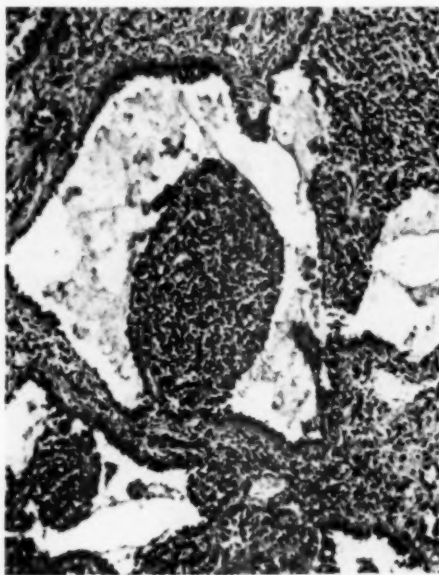
Fig. 1—Photograph (gross) of the ovarian tumor cut in cross section.

be enlarged to an estimated weight of 5 lb. and in a somewhat pendulous position. The right ovary was small and atrophic. The cervix and vagina were normal. The estrous cycle could only be detected by the use of the speculum. In spite of this, the mare was known to tease other mares while in pasture.

On April, 1948, while being led on a cement roadway, the mare reared, fell over backward and struck her head on the pavement. Death was instantaneous. Necropsy examination four hours later revealed extensive hemorrhage from the right ear, nostrils, and mouth, and in the subcutaneous tissues about the frontal, parietal, and occipital regions of the skull. Large

A selected case from the Registry of Veterinary Pathology, Army Institute of Pathology, Washington, D. C.

<sup>1</sup>Nieberle, Karl, and Cohrs, Paul: *Lehrbuch der Speziellen Pathologischen Anatomie der Haustiere*. 6th ed., 1941. Fisher, Jena.



—AIP Neg. 207096-5

Fig. 2—Granulosa cell tumor of ovary. x 91. Note the folliculoid pattern of the new growth.

suggested the gross appearance of the ovary. The cut surface (fig. 1) of the tumor was yellowish gray, flecked with blood, finely lobulated, and firm in consistency.

Specimens from this animal were submitted to the Army Institute of Pathology for microscopic examination. The following description is abstracted from the pathologic report (AIP 207096):



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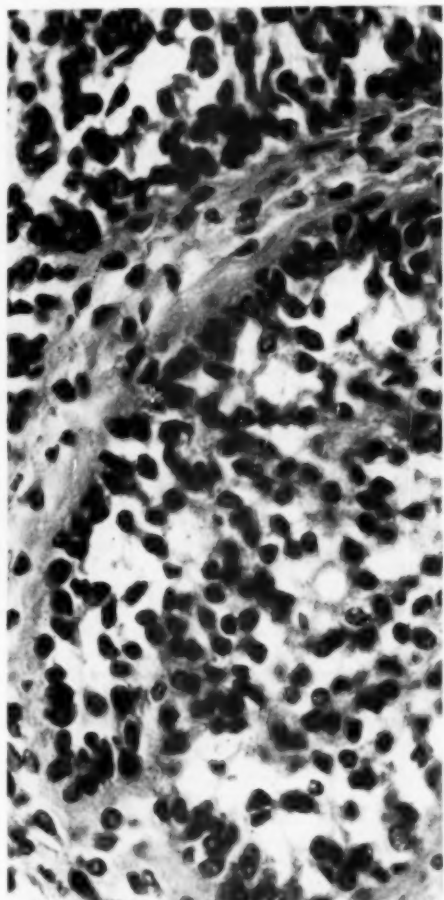
Fig. 3—Granulosa cell tumor of ovary.  $\times 140$ . One of the areas in which a Graafian follicle is simulated by the new growth.

The splenic lesion was found to be due entirely to acute congestion. The section of the ileum revealed the subserous lesion to consist of rather dense collagenous connective tissue, with a rich vascular supply in which were many collections of hemosiderin-laden macrophages. Eosinophils were common in the adjacent submucosa. This lesion has been described by Nieberle and Cohrs,<sup>2</sup> named "haemomelasma ilei," and is attributed by them to the migration of strongyle larvae.

In sections of the right ovary was a dense, fibrillar mass of ovarian stroma, in which numerous thick-walled blood vessels were interspersed. Ovarian follicles were not recognized. A few macrophages laden with lipochrome pigment were seen throughout this stroma. No significant lesions were recognized in the right oviduct.

Although a small bit of ovarian tissue remained at one pole, most of the left ovary was

replaced by a large tumor. The new growth had stroma of a cellular, ovarian type through which numerous acinar structures were scattered (fig. 2). These acini in many places consisted of a single row of cells lining a cystic space filled with pale-staining debris. In many, however, the lining cells were proliferated and projected into the lumen of the acini, suggest-



—AIP Neg. 207096-2

Fig. 4—Granulosa cell tumor of ovary.  $\times 500$ . In this area is seen a solid mass of granulosa cells.

ing the appearance of the cumulus oöphorus. In many places, there was no lumen, but simply an irregular mass of cells with interlacing cytoplasm, and round or ovoid hyperchromatic nuclei. This was diagnosed as a granulosa cell tumor of the folliculoid type.

This tumor is quite rare in the equine species, although it has been reported in cattle and dogs.

# Biochemical Studies on Three Cows at Parturition Including One Case of Milk Fever

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SPECIMENS of blood, urine, and milk were collected from 3 cows periodically, preceding and following parturition. One of these cows developed milk fever after calving, but the other 2 remained normal. The results from chemical examinations of the specimens are reported and discussed from the standpoint of physiologic disturbances associated with the occurrence of milk fever and ketosis.

It is generally assumed that the cause of milk fever is to be found in the physiology of parturition and the onset of lactation. Fall in blood calcium and inorganic phosphorus, which is profound in milk fever, occurs to some degree characteristically at parturition.<sup>1-7</sup> Coinciding with this fall in calcium and phosphorus, the blood carbon dioxide capacity (*i.e.*, bicarbonate) tends to rise sharply at parturition, then drops to normal, and below normal during an attack of milk fever.<sup>7, 8</sup> Blood sugar tends to be elevated both at parturition and during an attack of milk fever, except when ketosis supervenes.<sup>8, 9</sup>

## PROCEDURES

Blood and urine specimens were collected at varying intervals preceding and following parturition, whereas milk was collected only after

From the Maryland Live Stock Sanitary Laboratory, University of Maryland, College Park.

parturition. Blood was drawn (1) under mineral oil with potassium oxalate (for pH, CO<sub>2</sub> capacity, Cl); (2) with potassium oxalate and no oil (for sugar, acetone); and (3) native blood for serum separation (for Ca, P). All urine specimens were qualitative—no attempt was made to determine secretory rate. Since the calves were permitted to suck, volume of milk secreted was estimated from the weight of the calf and the excess milked out. Analyses were begun promptly on all specimens.

Reaction of the whole blood, urine, and milk was measured on a Beckman pH meter, laboratory G model. Carbon dioxide capacity was determined on plasma and urine (Van Slyke and Cullen<sup>10</sup>), while carbonic acid and bicarbonate were calculated according to Van Slyke and Sendroy.<sup>11</sup> In general, the methods followed were the same for blood, urine, and milk: chlorides (Van Slyke and Sendroy<sup>12</sup>), calcium (Clark and Collip<sup>13</sup>), phosphorus (Youngburg and Youngburg<sup>14</sup>), blood sugar (Folin and Wu<sup>15</sup>), total acetone bodies (Behre and Benedict<sup>16</sup>); on urine total organic acids (Van Slyke and Palmer<sup>17</sup>), ammonia (Van Slyke and Cullen<sup>18</sup>), creatinine (Folin<sup>19</sup>), and phenols (Volterra<sup>20</sup>).

## RESULTS

*Experiment 1.*—Cow D.M., a 4-year-old grade Guernsey with a history of two normal parturitions and no milk fever or ketosis, produced 8,190 lb. of milk during

TABLE I—Cow D.M., 4-Year-Old Grade Guernsey

Date 1948	Time (a. m.)	Condition	Blood							
			pH	H <sub>2</sub> CO <sub>3</sub>	BHCO <sub>3</sub>	Cl	Ca	P	Sugar	Acetone
4- 7	11:00	Normal, feces sloppy	7.45	0.9	26	96	7.8	6.3	37	2.0
4-14	11:00	Normal, feces sloppy	7.37	1.0	24	104	10.1	3.5	52	1.5
4-16	10:30	Normal, feces sloppy	7.34	1.2	28	100	10.6	5.2	41	1.7
4-19	10:30	Normal, feces sloppy	7.32	1.2	26	...	9.8	3.4	47	1.3
4-20	10:45	Normal, feces sloppy	7.30	1.2	26	102	10.5	5.9	47	1.5
4-21	10:00	Normal, feces sloppy	7.31	1.1	24	104	9.0	5.3	49	1.5
4-23	11:00	Normal, feces sloppy	7.30	1.3	27	100	9.6	6.8	42	2.9
4-26	11:00	Normal, feces sloppy	7.29	1.3	26	106	9.8	3.2	45	2.4
4-27	10:00	Normal, feces sloppy	7.29	1.3	26	108	9.3	3.0	38	1.9
4-29	9:30	Normal, feces watery	7.31	1.1	23	110	9.1	3.0	48	2.1
4-30	6:30	Normal, feces watery	7.30	0.9	20	108	8.9	2.5	58	2.0
	8:45	Calved, normal, cleaned								
5- 1	9:30	Normal, feces soft	7.32	0.9	20	108	7.8	3.5	42	2.1
5- 2	11:00	Normal, feces sloppy	7.29	1.3	26	101	8.5	3.7	27	2.1
5- 3	8:45	Normal, feces sloppy	7.30	1.2	25	99	9.1	4.8	49	2.1
5- 4	8:45	Normal, feces soft	7.32	1.2	25	96	9.3	3.2	46	1.9
5-21	10:30	Normal, feces sloppy	7.26	0.9	18	89	9.7	3.7	42	2.5



the previous lactation (305 days). On April 7, 1948, she was brought from pasture into the stable where she calved April 30 and remained until May 21. Throughout this period, her stools were soft, described alternately as "sloppy" and "watery," although she received dry feed exclusively — alfalfa hay and "16 per cent" dairy feed. Her parturition was normal, delivering a healthy bull calf, and milk flow responded promptly. There were no physical symptoms of milk fever or ketosis.

The most significant changes detected were in the calcium and sugar levels in the blood. Serum calcium dropped progressively from 9.8 mg./100 cc. four days before parturition to a low of 7.8 mg./100 cc. on the day following parturition, thereafter returning to the preëxisting levels. Simultaneously, inorganic phosphorus fell to 2.5 mg./100 cc. at parturition. Blood sugar, however, rose to 58.0 mg./100 cc. at parturition and then fell to a low of 27.0 mg./100 cc. two days later, although total acetone levels in blood and urine remained unchanged.

As indicated in table 1, this reduction in blood calcium was accompanied by reduction in the concentration of calcium in the urine, whereas inorganic phosphorus never exceeded a trace in the urine. Blood bicarbonate fell during the period of reduced blood calcium, while blood chloride did not begin to fall until after that period. Urine concentrations of bicarbonate and chloride fluctuated considerably, but they both tended to be lower after parturition than before. Blood pH remained remarkably constant through the parturient period, ranging between 7.29 and 7.32 from April 19 to May 4, indicating that the variations in carbonic acid reflected changes in blood bicarbonate. Urine pH remained relatively

high through parturition, accompanying unexplained high ammonia levels.

Although the urine specimens were qualitative, some estimate of their relative volumes can be presumed from the specific gravity. Previous to parturition, specific gravity varied between 1.020 and 1.029, suggesting reasonably constant volumes; but after parturition, it fell progressively to 1.005, indicating high dilution and much larger total output. Accordingly, while it is impossible to determine the exact output of the various urine constituents, it seems evident that some of them (e.g., bicarbonate, organic acids, acetone, ammonia) must have been increased beyond the pre-parturient levels.

*Experiment 2.*—Cow U.M.L., a 6-year-old purebred Guernsey with a history of four normal parturitions and no milk fever or ketosis, produced 8,352 lb. of milk during the preceding year (371 days). When first examined, she was at pasture, but thereafter she remained in the barn, receiving alfalfa hay and mixed grain. Her stools were soft until parturition, then they became formed and continued so until she was again turned out to pasture. Parturition was uneventful, yielding a large bull calf. The cow came into production promptly, producing an estimated 15 to 18 lb. of milk daily during the four days immediately after parturition. At no time did she show physical symptoms of milk fever or ketosis.

As in the foregoing case, this cow showed progressive reductions in calcium and sugar levels in the blood. Serum calcium fell from 9.8 mg./100 cc. two days before calving to a low of 8.1 mg./100 cc. three days thereafter. Likewise, inorganic phosphorus fell to 2.5 mg./100 cc. at parturition, then returned to normal. Blood sugar went to a maximum of 66.0 mg./100 cc. at parturi-

TABLE 1—Cow D.M., 4-Year-Old Grade Guernsey

Sp. Gr.	Urine							Milk				
	pH	BHCO <sub>3</sub>	Cl	Ca	P	Acetone	Organic Acids	NH <sub>3</sub>	pH	Cl	Ca	P
...	8.1	66	109	0.3	tr.	7.0	10.3	2.3	...	...	...	...
...	7.1	11	161	13.9	tr.	3.2	7.7	5.8	...	...	...	...
1.029	7.8	50	172	7.6	tr.	3.5	8.7	1.5	...	...	...	...
1.026	7.4	23	173	6.3	tr.	3.0	10.4	13.1	...	...	...	...
1.027	8.2	105	138	1.3	tr.	2.0	13.3	16.4	...	...	...	...
1.024	8.1	52	168	1.6	tr.	2.8	11.9	15.2	...	...	...	...
1.025	8.4	82	164	7.4	tr.	10.1	11.7	33.4	...	...	...	...
1.029	8.5	210	76	4.6	tr.	7.5	18.1	64.4	...	...	...	...
1.020	8.5	54	159	4.5	tr.	1.4	8.4	...	...	...	...	...
1.020	8.7	150	138	4.9	tr.	3.7	11.6	86.0	...	...	...	...
1.022	8.8	72	158	2.4	tr.	4.2	15.9	210.0	...	...	...	...
1.016	8.2	36	96	...	tr.	3.8	15.8	88.0	6.7	217	56	38
1.017	8.6	74	68	1.2	tr.	4.3	13.4	75.0	6.5	128	141	56
1.005	8.0	27	12	0.6	tr.	2.7	5.0	26.0	6.6	148	115	53
1.010	8.3	64	33	1.4	tr.	3.3	8.6	67.0	6.8	126	140	38
1.011	8.5	..	107	15.6	tr.	5.5	16.9	126.0	6.6	69	134	52

TABLE 2—Cow U.M.L., 6-Year-Old Purebred Guernsey

Date 1948	Time (a. m.)	Condition	Blood					Sugar	Acetone	
			pH	H <sub>2</sub> CO <sub>2</sub>	BHCO <sub>2</sub>	Cl	Ca			
4-12	11:00	Normal, feces sloppy	7.34	1.1	25	104	9.4	6.2	48	1.7
4-15	11:30	Normal, feces sloppy	7.30	1.3	27	102	10.0	3.4	53	1.5
4-17	10:45	Normal, feces sloppy	7.34	1.0	24	102	9.8	3.4	52	1.8
4-19	11:00	Normal, feces sloppy	7.32	1.2	26	104	9.8	4.2	49	1.3
4-20	11:00	Normal, feces sloppy	7.30	1.3	27	102	9.8	5.0	55	1.4
4-21	10:00	Normal, feces sloppy	7.29	1.2	25	104	9.1	4.2	52	1.6
4-22	(p. m.)									
	1:30	Normal, feces sloppy	7.30	1.3	27	104	9.1	2.5	66	2.2
	3:00	Calved, normal, large calf, cleaned								
	(a. m.)									
4-23	10:00	Normal, feces formed	7.29	1.3	26	101	8.5	3.8	48	2.0
4-24	10:00	Normal, feces formed	7.29	1.3	26	95	8.3	3.3	43	2.2
4-25	11:00	Normal, feces formed	7.30	1.2	24	99	8.1	3.5	28	3.0
4-26	10:00	Normal, feces formed	7.30	1.2	24	96	8.5	4.2	31	6.9
	(p. m.)									
4-29	1:30	Normal, feces soft	7.32	1.2	27	96	9.9	3.5	38	3.4

tion, and then fell to a low of 28.0 mg./100 cc. three days later. Simultaneously with this reduction in blood sugar, blood acetone rose from 2.0 to 6.9 mg./100 cc. on the following day, while urine acetone went from 6.7 to 49.0 mg./100 cc.

These changes in blood calcium and sugar were accompanied by no significant variations in pH or bicarbonate of either blood or urine, although blood and urine chloride levels were reduced during the postparturient period. Again, the urine concentration of ammonia was enormously increased, accompanying the rise in urine acetone bodies. In this cow, specific gravity remained rea-

sonably constant throughout the study, allowing more reliable estimations of relative output.

*Experiment 3.*—Cow U.M.P., a purebred Guernsey, weighing about 1,100 lb., with a history of five normal parturitions and no milk fever or ketosis, produced 10,150 lb. of milk during the preceding year (344 days). This cow was first examined two days before she calved. Following calving, she retained the placenta, but otherwise appeared normal for thirty-six hours. At this time (36 hours after parturition), she appeared slightly depressed. Five hours later, incoördination had developed, and by

TABLE 3—Cow U.M.P., 7-Year-Old Purebred Guernsey

Date	Time	Condition	Blood						Sugar	Acetone
			pH	H <sub>2</sub> CO <sub>3</sub>	BHCO <sub>3</sub>	Cl	Ca	P		
6-2	(p. m.) 3:00	Normal, eating	7.33	1.6	25	98	9.5	5.3	41	1.7
6-4	(a. m.) 2:00	Calved, normally, retained placenta	...	...	...	...	...	...	...	...
6-5	9:00	Normal, calf sucking	7.37	1.4	25	99	8.2	2.1	43	1.2
	9:00	Normal, retained placenta	7.33	1.3	22	99	4.9	1.5	40	2.0
(p. m.)	2:00	Slight depression (dullness)	...	...	...	...	...	...	...	...
	7:00	Incoördination, up, eating	...	...	...	...	...	...	...	...
(a. m.)	5:00	Down, conscious, cannot rise	...	...	...	...	...	...	...	...
	11:50	Same, intermittent prostration on side	7.30	1.4	21	100	2.6	<0.2	48	2.3
(p. m.)	12:05	Injected phosphate—no benefit	...	...	...	...	...	...	...	...
	1:33	Injected Ca gluconate, 115 Gm.	...	...	...	...	...	...	...	...
(a. m.)	3:30	Conscious, eating, drinks water	...	...	...	...	...	...	...	...
	5:00	Up, incoördination	...	...	...	...	...	...	...	...
6-7	9:00	Same, quivering in front leg	7.40	1.4	26	90	8.4	6.5	42	1.3
6-8	10:00	Normal, feces soft, placenta still retained	7.32	1.5	23	95	9.0	8.8	40	2.3

H<sub>2</sub>CO<sub>3</sub>, BHCO<sub>3</sub>, Cl (blood, urine) expressed as milli-equivalents per liter. Organic acids expressed as milli-equivalents per 100 cc. Ca, P, sugar, acetone (total), NH<sub>3</sub>, creatinine, volatile phenols, aromatic



TABLE 2—Cow U.M.L., 6-Year-Old Purebred Guernsey

Sp. Gr.	Urine							Milk						
	pH	BHCO <sub>3</sub>	Cl	Ca	P	Acetone	Organic Acids	NH <sub>3</sub>	pH	Cl	Ca	P		
...	8.2	140	119	0.8	tr.	7.6	27.9	1.7	...	...	...	...		
1.040	7.8	108	198	36.6	tr.	8.3	24.0	0.6	...	...	...	...		
1.037	7.8	54	60	3.8	tr.	8.7	21.5	2.6	...	...	...	...		
1.035	7.7	39	157	18.2	tr.	3.3	18.9	3.1	...	...	...	...		
1.034	8.1	62	146	7.2	tr.	2.4	17.0	1.7	...	...	...	...		
1.024	7.8	44	135	0.9	tr.	5.9	12.1	2.0	...	...	...	...		
1.035	8.3	135	59	0.5	tr.	6.2	15.8	2.9	...	...	...	...		
1.034	8.0	60	45	0.3	tr.	7.9	13.7	31.3	6.2	148	154	90		
1.031	8.7	185	82	3.3	tr.	6.7	13.5	96.4	6.3	156	77	61		
1.027	8.5	150	35	0.6	tr.	22.0	14.0	47.7	6.1	115	152	54		
1.031	8.6	185	82	1.5	tr.	49.0	20.3	246.0	6.3	111	145	72		
1.030	7.9	88	62	6.4	tr.	3.8	18.8	19.0	6.5	122	136	66		

the following morning (51 hours after calving), she was down and unable to rise.

In view of the extremely low blood inorganic phosphorus level at this time (less than 0.2 mg./100 cc.), we injected a buffered solution of sodium phosphate, equal to 14.2 Gm. of P. Although this injection was followed by a rise in blood P to 10.6 mg./100 cc. measured three minutes later, there was no visible improvement in the cow, and seventy-two hours after the injection of phosphate, when blood P had dropped to 3.7 mg./100 cc., we began an intravenous injection of calcium gluconate, 115

Gm. Within two hours, the cow was eating grain and drinking water, although she remained down until the following morning.

The most significant changes biochemically in this cow, preceding the onset of milk fever, were in the blood calcium and inorganic phosphorus. Serum Ca fell from 9.5 mg./100 cc., two days before calving, to 2.6 mg./100 cc. when she received treatment two days after parturition. Coinciding with these changes, P fell from 5.3 to <0.2 mg./100 cc. Both Ca and P were normal twenty hours following Ca gluconate therapy. Blood sugar and acetone remained

TABLE 3—Cow U.M.P., 7-Year-Old Purebred Guernsey

Urine												Milk			
Sp. Gr.	pH	BHCO <sub>3</sub>	Cl	Ca	P	Acetone	Organic Acids	NH <sub>3</sub>	Creat- inine	Volatile Phenols	Aromatic Hydroxy Acids	pH	Cl	Ca	P
1.031	8.2	140	31	2.7	2.5	6.8	16.9	0	158	47	54	..	..	..	..
1.033	8.1	150	94	0.9	0.5	5.4	11.7	1.5	156	39	42	6.2	163	127	50
1.037	8.0	73	72	0	tr.	4.8	15.7	7.0	250	61	27	6.1	116	65	51
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1.032	8.0	88	46	0.9	tr.	9.2	15.8	5.5	280	61	23	6.1	161	139	65
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1.033	6.6	6	15	4.0	12.2	4.2	27.0	23.0	212	69	22	6.3	94	121	57
1.022	7.3	38	0	1.1	75.0	4.0	10.9	11.0	135	..	..	6.3	137	102	39

hydroxy acids, Cl (milk) expressed as milligrams per 100 cc. Sp. Gr. (specific gravity) determined by hydrometer. pH (H-ion concentration) determined electrometrically (Beckman).

normal and showed little change during this period.

With the onset of milk fever, blood pH fell from a high of 7.37 to 7.30, only to rise temporarily to 7.40 on the day following recovery. Comparable changes appeared in blood bicarbonate, reflecting a relatively constant blood carbonic acid level. Blood chloride also remained constant during this period. Following treatment, blood Cl fell significantly, as did urine Cl and  $\text{BHCO}_3$ , and urine pH. This latter change was accompanied by a sudden rise in urine organic acids and ammonia. Urine creatinine, however, rose progressively during the preliminary period, then subsided following treatment.

#### SUMMARY

From a study through the parturient period of 3 cows, 1 of which developed milk fever, it appeared that the drop in blood calcium, which is restricted in the normal cow, but extreme in milk fever, is accompanied by little significant variation in the other biochemical features examined in these experiments. Blood pH was elevated at the beginning of the milk fever attack, but there was no change in blood pH during the entire parturient period of the other cows. Blood sugar showed a similar drop to that for calcium, and in 1 cow this reduction was accompanied by increased output of acetone bodies. Both normal cows revealed remarkable increases in urine ammonia, despite complete lack of evidence of acidosis.

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#### The Mechanism of the Action of Dicumarol

Recent studies by MacMillan (*Science*, 108, Oct. 15, 1948: 416-417) of the clotting time when dicumarol plasma is mixed with whole normal plasma, Seitz-filtered plasma, defibrinated plasma, and serum, indicate that when normal plasma is added to dicumarol plasma, the prothrombin content of the mixture is increased more than can be explained by the simple mixing of prothrombin solutions of different concentrations. He believes that a prothrombin accelerator in normal plasma, which is deficient in dicumarol plasma, serves to explain this action. He believes that the prothrombin time may be prolonged in the clotting process.

In the early days of horse breeding, no horseman thought of buying a stallion without a veterinary examination and a certificate of soundness. How many cattle breeders do you know who even think of this as an advisable procedure when they pay \$50,000 or more for a bull?—H. E. Kingman, D.V.M., Wyoming.

Parturition does not interfere with the accuracy of the agglutination test for brucellosis.

# Open Reduction with Metallic Fixation in Man

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OPEN reduction and internal metallic fixation by means of screws and plates for the long bones, and of hip nails for the neck and intertrochanteric areas, is becoming an accepted practice. The economic considerations are early return to work because of more rapid healing, mobility and partial use of the part, and the shortened hospital stay. Medically and surgically, the reduced time of bed rest and recumbency decreases complications, *i.e.*, pneumonia, embolus, muscular contractures, kidney stones, etc.

Certain parallels may be drawn between human and small animal fractures; for instance, the resorption of the femoral neck.

## METALS USED IN OPEN REDUCTION

In the treatment of fractures by open reduction, various metals have been used from antiquity and certainly before the early recorded use of gold in 1565. At the present time, (1) stainless steel, (2) tantalum, and (3) vitallium are favored.<sup>7-8</sup>

1) Stainless steel, as used today, is either 18-8, type 302, or 18-8 SMO, type 316. The latter seems to be favored. It is 18 parts chromium, 8 parts nickel, 2 to 3 parts molybdenum, and the balance is principally iron.

2) Tantalum, an element, is expensive and difficult to stabilize as to hardness. Hardening is accomplished by a certain type of gas absorption by the metal, and this gas may be oxydized with a concomitant loss of metal strength. Its basic strength has not been great enough to justify its use where stresses are great. However, it is ideal for suture material, foil, and plates for skull defects.

3) Vitallium is an alloy of cobalt, chromium, and molybdenum. So far, it can only be cast, and as a cast metal it has defects which, though recently improved, leave some features to be desired. It is probably the least reactive of the compound alloys and has little or no iron in its make-up. If it had greater ductility and drawing characteristics, it would be the ideal metal for internal fixation.

It seems that a center of the road course must be chosen, small sacrifice being evident in the use of each of the aforementioned metals and alloys: the strength of stainless steel versus the isoelectrolytic fac-

tors of tantalum and vitallium. Other metallic combinations, or even plastic materials, may come into use, such as the new element zirconium<sup>1</sup> and ticonium,<sup>1</sup> an alloy similar to vitallium which in addition to cobalt, chromium, and molybdenum, also contains nickel. There is constant research for improved materials to replace the imperfect ones in use today.

In man, the reaction of salts, especially that of the chlorides in the solution, may react on metals, and this is the weakness of stainless steel. There are some patients on which no metals have been successfully used: vitallium, tantalum, or stainless steel. In one patient, a foreign body reaction necessitated the removal of one metal plate and, at later application of a different metal, the reaction was repeated. However, with the improved manufacture of metallic means of internal fixation and technique of application, this condition is increasingly rare.

It is important that stainless steel drills be used for screw holes, so that no iron oxide will be deposited to set up a chemical or electrolytic reaction. Our own experience has been that aseptic necrosis around screws has decreased markedly since stainless steel drills have been used. The use of the hand drill, though slower, is an advantage, as the heat produced by the fast-moving electric drill is at least partly responsible for the "doughnut" aseptic necrosis about screws.

Uniform composition of metals in plates and screws is essential, and the hardness of each should be approximately the same, within 5 Rockwell points or other hardness scales.

The increased hardness of stainless steel (which we will assume is 18-8 SMO, type 316) to a Rockwell C scale hardness (30 to 35) is only slightly under that in which stainless steel becomes magnetic, at which time it begins to take on the characteristics of nickel and iron.

We believe the increased hardness makes even 18-8 SMO more subject to chemical or electrolytic reaction.

A high polish on stainless steel plates, screws, and drills is required, and passivation (treatment with nitric acid solution) or electrolytic polishing are processes which decrease the surface area to a minimum and remove all the surface impurities.

Standards are being developed to make

Presented before the Section on Small Animals, Eighty-fifth Annual Meeting, American Veterinary Medical Association, San Francisco, Calif., Aug. 16-19, 1948.

all products comply to a definite formula and hardness, with standard labeling and guaranteed specifications by the manufacturer. These standards may eventually be established by the Bureau of Standards and be enforced by the U. S. Public Health Service. In January, 1941,<sup>7</sup> the Committee on Fractures and Other Traumas, of the American College of Surgeons, met in New Orleans and formed a Subcommittee on Screws and Plates. Sometime later, this subcommittee reported, and the work was referred to the Committee of Medical Research, of the Office of Scientific Research and Development. The problem was then submitted to Columbia University where the late Dr. Clay Ray Murray was director of experiments. Further meetings have been held and certain standards have been recommended which have been covered, in general, above.

Many articles for the internal fixation of fractures are manufactured of metal. In general, these are plates,<sup>3, 4, 6</sup> nails for fractured femur necks and intertrochanteric femur fractures, and even for use in arthrodesis; screws, rods, and pins for every conceivable use; Steinmann, Kirschner, Stader, and Küntschner pins are used mainly for skeletal traction, intramedullary application,<sup>2</sup> beaded wire, and other forms of fixation.

#### PRECAUTIONS IN OPEN REDUCTION

With open reduction, a compound wound is produced and it must be treated as such. Even with the danger of reaction to penicillin, extensive bone operations may be preceded by one or two days of that therapy.

Hematoma must be avoided as it is a perfect culture medium for bacteria after open reduction. The sulfonamides are no longer dusted in wounds, but defects in bone may be filled, if muscle tissue is not available, with gelfoam soaked in penicillin solution, 20,000 units per cubic centimeter. This is important in oozing about the spinal cord and for protection of the dura of the spinal cord. The prevention of bleeding by its use becomes one of the assets to asepsis by preventing hematoma.

Adequate preparation for open reduction is essential. Shaving and a 24- or 48-hour sterile soap and water scrub, repeated again immediately before operation, is important. We are still using one-half strength iodine as the final step before incision and draping. The "nontouch technique" as far as skin is concerned is most important, and the skin should be walled off from the wound, or other protection attached to the skin by counted skin clips or sutured to the skin margins. Very few

orthopedic surgeons now use the Lane technique.

However, one should not be lulled into a false sense of security by the availability of penicillin and the triple sulfonamides or other excellent drugs. They must not be an excuse for careless technique or lack of good surgical judgment, but should stimulate the surgeon to an even better technique so that operations previously impossible may now be performed. The six-month to one-year waiting period after cleared bone infection has now been reduced to one or two months, or at most three, and massive bone grafts<sup>5</sup> and spinal fusions do not carry the infection risk they previously did. Restoration of large bone defects is now practical.

The indications for internal fixation may easily be found in the literature. It is true that most fractures can be reduced by closed methods.

Actually, the element of time and mobilization, which may be another way of saying "economy of the working hours of man," is the more commercial aspect and is the indication for an industrialized people.

Few today can deny the better results of hip nailing with its early mobilization of the body and without the fear of the complications of recumbency.

Open reduction should be done on chosen cases which have special problems. It should not be assumed that all fractures be openly reduced any more than all fractures should be treated by closed reduction.

The general limitations to open reduction are: (1) age (though femurs have been nailed with recovery at 100 years of age); (2) jeopardy to life; (3) the physical condition; (4) lack of proper facilities; and (5) lack of lay education to the advantages of internal fixation.

The local indications are: (1) Will the fracture be better reduced? (2) Will there be a quicker recovery? (3) Will there be a shortened recumbency, lessening the possibility of pneumonia, decubitus, and kidney stones (nephrolithiasis)? (4) Is it economically sound as to recovery time and early use of the part? (5) Medicolegal standards.

The complications are: (1) possible infection; (2) shock of the surgical procedure; (3) vascular and other accidents following operation.

Further, available whole blood is a necessity. A minimum of 70 per cent or 13 Gm. of hemoglobin is required, and often this must be supported by transfusion. The large individual with excellent blood findings is less able to cope with blood loss than a patient who is "used to" anemia.

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## DISCUSSION

QUESTION: What is the source of the cancellous bone?

DR. TOWNSEND: The source of the cancellous bone is the ilium or the hip bone. If you are operating on the back, you can get it from the posterior ilium. If you are doing a sliding graft in the tibia, you can get it from the lower or upper end of the tibia, but you cannot get very much. Generally, it can be taken from the anterior crest of the ilium.

The crest of the ilium is replaced and stitched so that it retains its shape, because it is the soft cancellous bone between the walls of the ilium that you want. With cancellous bone, there is union in a large percentage of cases.

QUESTION: How long do you give penicillin?

DR. TOWNSEND: At least twenty-four hours; if possible, forty-eight hours before and seven days after a big operation.

QUESTION: What will happen if you do not cast the humerus?

DR. TOWNSEND: There might be a little more pain, and that is about all. You could hang it in a sling after plating and it would bend a little. I had a couple that bent. I asked one patient about it, and he said that he could reach around corners a little better. It takes only about 3 lb. of traction to reduce a humerus. You do not have to put a cast on. A lot of doctors do not even use casts in fractures of the tibia, as I did. I still do not use casts on femurs, but put them in a Thomas Ring Splint with Pearson attachment and start knee action early. With every fractured femur that is not done that way, there is partial ankylosis of the knee joint, which seldom gets better than an 85 degree range.

QUESTION: How do you correct a big over-ride that has been done a little too long?

DR. TOWNSEND: When you come to leg lengthening, you have a real problem. In a human patient, we put pins above and below the fracture, and with the traction apparatus pull it out gradually for an hour or so, and then plate it. You know the old method is, if you cannot get one bone long enough, make the other leg shorter. [Laughter.]

QUESTION: How about the time lag from fracture until the operation?

DR. TOWNSEND: It should be set, of course, as soon as the patient is able to have it done. If a compound fracture is not reduced in the first six hours after thorough debridement and cleansing, it should not be plated. On the other hand, if you have an ordinary, uncomplicated fracture, say

a simple fracture, then it can be done at any time within several weeks. With the last patient, it was more than two weeks before we could operate because of a hematoma near the kidney. If you let it go much longer than that, healing will have started, particularly in young patients, and the bone may be in poor position. We have operated as late as four or six weeks. When you do that, the screws do not stick so well because the bone is soft. We think we have that solved now by special nuts to put on the screws so they do not pull out.

QUESTION: Do you find curare valuable in getting relaxation?

DR. TOWNSEND: I let the anesthetist worry about that. You would be surprised how well it works in selected cases. Of course, with us, the anesthetist has charge of that. He looks over the case to see if curare is indicated.

QUESTION: How about nutrition in the older cases?

DR. TOWNSEND: A lot of these old patients have a demineralization which can be helped, we think, by a high calcium diet, an increased hydrochloric acidity of the stomach, or at least a guaranteed acidity of the stomach, and by vitamins. We do not even force vitamin D. We give a good balanced vitamin regimen. If too much vitamin D is given, some authorities believe that kidney stones are formed. A green leafy vegetable diet, plenty of whole wheat cereal and wheat germ, whole wheat bread, and similar foods seem beneficial.

These patients seem to get along and to recover all right. In all fracture healing there is some Sudeck's atrophy, or demineralization of bone which goes into the blood stream and which does not re-deposit very soon. That is one reason you have so many complications with ankle and knee joints. Diet has a big place in this, I believe.

QUESTION: Do you have a lot of postoperative swelling?

DR. TOWNSEND: There is postoperative swelling. Of course, when you do an open reduction, if you use interrupted sutures, there will be leakage on the dressing, so you do not have to worry so much. Limbs have to be elevated (20 to 30 degrees) or the cast bivalved because of the swelling.

In forearms, we split the cast at the time it is applied, then wrap it with wet gauze. Do not wrap it with dry gauze, as it absorbs the moisture from the plaster and shrinks, tightening the cast. The gauze may be removed at any time and the cast spread. Always put the groove where it will not make any difference in the reduction of the fracture.

QUESTION: What would be the effect of screwing a fracture of the condyles?

DR. TOWNSEND: We try to do it through and through, making a lateral incision to avoid the ulnar nerve, and putting the screw in the nonarticular surface. The intercondylar area is very thin.

We also use another technique of taking a straight, stiff wire and running it diagonally up the shaft of the humerus or the shaft of the bone through the condyles first, thus transfixing them. We leave the wires through the skin, well dressed, and later, after the healing is established, pull them out.

You can transfix the bone with screws, but if the screw is too long, it will come out on the medial side, and then you have to make an incision over the point to cut it off. This holds well. You can run the wire diagonally through the shaft of the humerus, after the method of Küntscher, and that will stabilize in the other plane.

In human beings, it takes about three months for the average arm to get enough callous so it won't angulate in the upper condylar area.

(Applause.)



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# CLINICAL DATA

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## Clinical Notes

As long as any reflex action remains in a paraplegia case, there is hope of recovery.

Sodium citrate is valuable as an intravenous medication in surgery of the horse and also in lead poisoning.—*W. D. Daugherty, Illinois.*

When making intravenous injections into light horses, listen to the heart beat during the entire time that the injection is being made.—*I. E. Hayes, D.V.M., Iowa.*

The veterinary practitioner who does the most for his community collaborates with the disease-eradication programs of all types.

The future will see us count our livestock wealth not so much in numbers, as at present, but in pounds of meat produced per acre.—*George H. Hart, D.V.M., California.*

When large and mottled liver is found in a pig on postmortem examination, it is well to suspect pitch poisoning from the ingestion of clay pigeons.—*H. C. H. Kernkamp, Minnesota.*

While the cardiac rhythm in man should be regular even when the rate is accelerated by exercise, the rhythm in dogs may be irregular habitually without necessarily indicating a pathologic condition.—*Dr. W. J. Lentz, Univ. of Pennsylvania Bull., Jan. 18, 1948.*

Microscopic finding of isolated acid-fast bacilli in a feces sample should not be interpreted as an indicator of John's disease.—*Vet. Rec., July 10, 1948.*

The specified and implied obligations of veterinary practice include more than a knowledge of veterinary medicine. They include also a rendition of veterinary service, and this service must be rendered in such a way that the client appreciates it.

More than 50,000 heifers are present in Illinois as the result of artificial insemination during 1948 alone.

Comfortable pigs turn feed and water into cash because the pig is a comfortable animal.—*J. B. Bryant, D.V.M., Iowa.*

There is growing evidence that the adrenal cortex may act as an inhibitor of hair growth.—*Science, Aug. 27, 1948.*

The veterinarian is an educator, and he gets the best results from those clients who are best informed regarding the objects of his work.

Be sure to have adrenalin handy when giving bacterins to calves, as anaphylactic shock is common.—*Dr. E. C. Howe before the Iowa V.M.A., Jan., 1948.*

Among the tick repellents, the best still are rotenone and its derivatives. These may be in the form of hydrogenated rotenone which is less of an irritant and is not toxic.

The greatest loss from ketosis is from mildly affected cows that produce 5 to 10 lb. of milk a day less than their normal milk flow. Glucose continues to be the standard treatment.—*R. P. Link, Illinois.*

Antemortem inspection of animals intended for human food is the exception rather than the rule in Britain.—*National Vet. M. A. of Great Britain and Ireland, Sept. 8-15, 1948.*

The program of mastitis control in Tennessee is based on the theory that every case of mastitis begins as an injury—mechanical, chemical, or thermal.—*A. A. McMurray, Tennessee.*

## Rattlesnake Bite

LIEUT. COL. RUSSELL McNELLIS, V.C., U. S. Army

Fort Robinson, Nebraska

VETERINARY literature contains little information concerning snake bite in animals, although this condition is of considerable importance in regions where poisonous snakes are numerous. Therefore, a case of rattlesnake bite in a horse in northwestern Nebraska, where rattlesnakes are numerous in certain pastures, is reported.

Early on the morning of Sept. 13, 1948, when the young stallions were brought from the night pasture to the stable, 4 exhibited pronounced swellings about the nostrils, upper lip, and throat. Examination revealed the typical fang marks of a rattlesnake.

One of the animals bitten developed into an acute case, requiring tracheotomy, and the photographs indicate the edema present. This young stallion (25M) was 2½ years of age, a Thoroughbred (Sir Door by Open Door out of Virginia Lass), and weighed 1,070 lb. When first seen, about 8:00 a.m., the patient appeared alert and attempted to eat in spite of the edematous lip. The pulse was rapid, ranging from 75 to 80. There was considerable hemorrhage from the nostrils (fig. 3, 4), which continued for approximately two hours. The mucous membrane on the under side of the upper lip was hyperemic and within a few hours turned a glistening light purple. As

soon as discovered, antivenin was administered intramuscularly to each animal bitten and the 2 cases showing dyspnea were immediately moved to a veterinary hospital so they could be under constant observation. By 11:00 a.m., the edema of the throat and anterior nasal region on stallion 25M had increased greatly in size and the nasal passages were completely closed; the visible mucous membranes became cyanotic, the head was extended, respirations were accelerated, and the animal became nervous. At this point, an emergency tracheotomy was performed under local anesthesia in the standing position in order to prevent suffocation. Immediately on insertion of the tracheal tube, the animal was greatly relieved and again behaved normally. By the afternoon of September 14, the edema was greatly reduced although the nasal passages were still closed. The following day, he was able to breathe through the nostrils and the tube was removed and an uneventful recovery resulted.

During the summer of 1947, 6 cases of rattlesnake bite in horses were treated at this station, and, of those, 1 required tracheotomy. It is believed that the rattlesnake responsible for the case described must have been of considerable size as indicated by: (1) the distance between fang

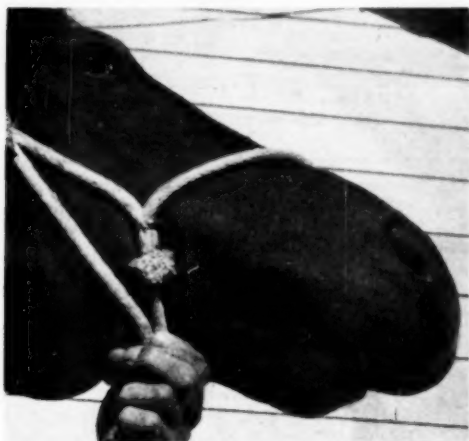


Fig. 1—A Thoroughbred stallion (25M) showing extensive edema as a result of snake bite.



Fig. 2—Stallion 25M showing fang marks (2 white dots) of rattlesnake along median line above nostrils.

marks (fig. 2—note fang marks along median line above nostrils and marked with two white points), and (2) the rapidity and extent of the edema.

In the experience of the author, the administration of antivenin is indicated and is valuable as it has a marked effect in re-

lieving the general and local symptoms, and it certainly shortens the period of convalescence. It is most important that where the edema is pronounced, the patient be under constant observation for several hours to determine if tracheotomy is needed to prevent death by suffocation.



Fig. 3 and 4—Hemorrhage from the nostrils of stallion 25M, which continued for approximately two hours.

#### *Systemic Fungous Infections in Animals.*

—A review of the systemic fungous infections which occur in animals has been prepared by Dr. Leon Z. Saunders, Department of Pathology, New York State Veterinary College, and published in *Cornell Veterinarian* (38, (July, 1948): 213-238).

Not only does this review discuss the many types of fungous infections found in all parts of the world, but it also lists a total of 138 references in its bibliography.

Calcium salts should be injected at concentrations of less than 30 per cent, and preferably even at less than 15 per cent. It takes only 1.7 Gm. of calcium ions to bring blood calcium from the milk-fever level back

to normal. The usual injection of 30 per cent calcium gluconate solution supplies 14 Gm., while a 15 per cent solution will supply 7 Gm. as against 1.7 Gm. needed.—*W. D. Daugherty, Illinois.*

The complexity of the ketosis problem is indicated by the wide variety of conditions which have been incriminated and may still be important. Among these are fatty liver, lack of sugar in the blood, endocrine imbalance, vitamin A deficiency, alkalosis, and probably others.—*W. D. Daugherty, Illinois.*

Numerous studies attest to the growth-promoting value of condensed fish solubles for chicks.

# Staphylococcc Mastitis

ROGER W. COLLINSON, D.V.M.

Chowchilla, California

THE TREATMENT of staphylococcc mastitis has long been one of the greatest problems for the practitioner in a dairy area. Penicillin, in various dosages and methods of administration, has proved ineffective against staphylococcc mastitis, both clinically and microscopically, especially in lactating animals.

Realizing the bacteriostatic effect of sulfathiazole against staphylococci, infected udders were infused with a solution of sulfathiazole sodium. However, this treatment was not satisfactory. Other medications have been similarly unsatisfactory. These factors proved that additional research and a variation in therapeutics was indicated.

Using these facts as a background for procedure, the possibility of obtaining any satisfactory results through the application of these methods of treatment was disregarded and attempts were made to find other means for satisfactory therapeutics for staphylococcc mastitis. *Staphylococcus aureus* toxoid was used experimentally. Its therapeutic value at that time was unknown, or unreported, in staphylococcc mastitis.

## PROCEDURE

Knowing that a definite diagnosis of staphylococcc mastitis is possible only by the use of laboratory methods, samples of milk from each animal were microscopically examined before beginning treatment. Believing that the low grade infections would show a lesser concentration of bacteria, each sample was examined thoroughly to avoid any error due to small numbers of organisms.

As only a few small cultures per smear are capable of producing infections, three colonies of bacteria per 100 fields were considered to be diagnostic.

Collection of samples was usually made by the client. This often led to contaminated samples being submitted, but these were retested in each instance. The sample bottles were sterilized and supplied by the author. The samples were incubated for eighteen to twenty-four hours at 99 F. When unavoidable, some samples remained in the incubator for additional hours, but retesting for comparison was often done, which showed that the

time element was not too important for diagnostic procedures.

Following incubation, a smear of each sample was prepared by the usual method and stained with Loeffler's methylene blue, and then an oil immersion, microscopic examination was made.

*Staphylococcus aureus* toxoid was then administered to all animals which were diagnosed in the laboratory as being infected with staphylococci or having combined infection of staphylococci and streptococci. Those animals which were infected with streptococci also received intramammary infusions of penicillin. All administrations of the toxoid were made by myself, to insure controlled procedure of the injections. Doses were varied at the beginning of the research to determine the most practical and economical quantities needed to obtain satisfactory results. At least three doses of the toxoid were administered (injected subcutaneously) to all animals at intervals of five to seven days. The dosages were not varied as to breed, size, production records, nor degree of infection.

At the beginning of the experiment, the quantity of toxoid administered was limited because of apprehension of anaphylactoid reactions. Later, larger quantities were injected on each occasion, with no harmful effects. However, the cost of the treatment for an entire herd, or major part of a herd, made this method undesirable. Therefore, a standard dose was given on each occasion and results were equally satisfactory.

Originally, 2 cc. were administered per animal on the first treatment and 4 cc. on the fifth day. Five days later, the dosage was increased to 5 cc. per cow.

The next experimental dosage was similar, except for the first inoculation which was increased to 4 cc., with the second and third injections remaining at 4 and 5 cc. The next step in variation of treatment was to administer 4 cc. on each of the first two treatments and to increase the third dose to 6 cc. These methods proved too expensive when treatment was given to a number of animals.

The next attempt was to lower the dosage to 3 cc. for the first dose, 4 cc. for the second, and 5 cc. as a final dose. This is the present method of treatment.

After the first series of 3 injections had been made, and one or two weeks had elapsed, some of the animals were retested. At this time, any animal which continued to demonstrate

Presented before the General Session, Eighty-fifth Annual Meeting, American Veterinary Medical Association, San Francisco, Calif., Aug. 16-19, 1948.

staphylococci received additional injections. The dosage was then increased to more than the third dose. On some occasions, 8 cc. were administered, then another similar dosage in five days, and then 10 cc. five days following the second injection. This method was later lowered to one additional 5-cc. inoculation, followed in five days by a 10-cc. dose.

Another variation is now being used, the subcutaneous administration of 5 cc. of *Staph. aureus* toxoid to every clinical case of mastitis in which the swelling and inflammation of the udder is not too acute. Toxoid has not been

and general contraction of the bacteria, possibly due to ingestion by leucocytes. The production of this cow increased about 30 per cent following the first treatment series. At present, one year following treatment, this cow is the highest producing animal in this herd.

The clinical reactions in herds 6 and 8 were similar.

Herd 6 contained 31 cows with a mixed infection of staphylococci and streptococci, and 1 uncomplicated staphylococcal infection. Each animal was treated with 4-, 4-, and 6-cc. injections and each was later found to be clinically sound.

Herd 8 contained 22 cows with a staphylococcal infection and 12 in which there was a mixed infection—staphylococcal and streptococcal. Each cow was injected with a series of 3, 4, and 5 cc. of toxoid and each was later pronounced clinically sound.

I was in close contact with herd 8. The report from the herdsman was encouraging. Following the first injection, little change was seen. However, at the time of the second inoculation, the herdsman reported an increase in production and a discontinuation of spread. When the last dose of the series was administered, the herdsman reported no further visible spread, and a continued increase in production. This same report was received about two weeks following the final treatment.

Cow 2 in herd 9 also presented interesting reactions following a 3-, 4-, and 5-cc. series of injections. She had just calved when the treatment was started. At that time, the secretion from all four quarters indicated severe mastitis, and diagnosis, verified by microscopic examination, revealed staphylococci. The first injection was made and five days later, when the second dosage was administered, the secre-

TABLE 1—Herd I

Cow	Type of infection	cc. per treatment series	Results following treatment
6	mixed*	2, 4, 5	clinically sound
4	mixed	2, 4, 5	clinically sound
12	mixed	2, 4, 5	clinically sound
13	Staph.	2, 4, 5	clinically sound
8	mixed	2, 4, 5	clinically sound
3	Staph.	2, 4, 5	clinically sound
10	Staph.	2, 4, 5	clinically sound
7	Staph.	2, 4, 5	clinically sound
9	Staph.	2, 4, 5	clinically sound
11	mixed	2, 4, 5	clinically sound
2	Staph.	2, 4, 5	clinically sound
1	Staph.	2, 4, 5	clinically sound
5	Staph.	2, 4, 5	clinically sound
15	Staph.	2, 4, 5	clinically sound
16	Staph.	2, 4, 5	clinically sound
Blackie	Staph.	2, 4, 5	microscopically infected
Blackie	Staph.	6, 8, 10	**

\*Staphylococcus and Streptococcus.

\*\*Very few bacteria, serrated borders. Considered arrested ninety days after treatment. No recurrence.

administered to those cases diagnosed as peracute.

The site of inoculation chosen is in the region of the neck or the shoulder.

In order to indicate the infection found by microscopic examination and the result following treatment, the animals have been tabulated, grouping them by herds (tables 1-4).

## OBSERVATIONS

Various clinical reactions have been observed during the course of treatment of the different herds. The more interesting of these will be described.

The cow "Blackie" in herd 1 was probably one of the most stubborn of all cases treated. Following the first series of injections, the milk seemed normal for about one week. Then symptoms of mastitis appeared and an additional dosage was administered. This was not sufficient, however, so the treatment was continued as shown in table 1. Approximately ninety days after the last inoculation was made, the milk was retested, and no normal bacteria were present. However, a few abnormally formed cocci were present, and these seemed to display serrated borders

TABLE 2—Herd II

Cow	Type of infection	Results	
		Following treatment	4 mo. later
Pinky	neg.	microscopic	Staph.
Ginger	Staph.	neg.	lt. Staph.
Sister	neg.	neg.	neg.
Warty	neg.	neg.	lt. Staph.
Cotton	neg.	neg.	Staph.
Brownie	mixed*	neg.	neg.
Splitter	mixed	V.L. mixed*	neg. (retreated)
Blacky	Staph.	neg.	neg.
Flossy	Staph.	neg.	neg.
Nelly	Staph.	Staph. & leuco.	neg. (retreated)
Teddy	neg.	neg.	lt. Staph.
Babe	neg.	neg.	Str.
Shorthorn	neg.	neg.	neg.

Injections of 3, 4, and 5 cc. were given.

\*Staphylococcus and Streptococcus.



tion had the appearance of milk with some "garget." When the final dose was administered, no abnormalities were visible and production was normal.

Herd 10 was by far the most closely observed. This dairy was under strict state inspection and the milk was checked regularly for bacterial count. It contained 18 cows with staphylococci, and 13 with a mixed infection. Each was treated with a 3-, 4-, and 5-cc. series of injections. Following the first inoculation, the bacteria count increased from approximately 16,000 per cubic centimeter to 28,000 per cubic centimeter. After the administration of the second dose of toxoid, the count began to decline and within five days was again 16,000. When the final treatment was administered, the count was still declining and, within a week after the last treatment, the milk tested from 1,000 to 3,000 bacteria per cubic centimeter, which indicates strongly the value of *Staph. aureus* toxoid. Other interesting reactions include an excessive amount of "garget" being excreted during the first week of treatment. Following the third treatment, the milk became so free of contamination as to permit the use of twice the usual number of filter pads. Recently, I inquired as to the bacteria count in this herd, and now, a year following treatment, the count never exceeds 3,000 organisms per cubic centimeter. Two cows continued to shed staphylococci,

4 mixed infections persisted, and 22 were negative. Three were not retested.

Herd 11 displayed an interesting feature. A second retest was made four months after the original retest. This test gives an indication of a possible immunizing ability of this toxoid (table 2).

Herd 12 was retested two months after diagnosis and treatment with results similar to herd 11—7 cows remaining infected, while 12 were negative.

Because of these results, a second retest was made on 4 cows of herd 13, with 2 cows remaining negative three months after treatment, while 2 again showed staphylococci infection.

Herd 14 was in extremely serious condition when treatment was begun. During the two weeks prior to treatment, peracute cases were appearing at each milking, and 2 or 3 head were lost with gangrenous mastitis. Following treatment, clinical mastitis was no longer appearing. Table 3 indicates the microscopic results.

#### CONCLUSIONS

It is my belief that, whenever possible, diagnosis should be based on microscopic examination of properly collected and prepared specimens. If laboratory examination reveals a staphylococci or mixed infection, the *Staphylococcus aureus* toxoid is indicated.

On basis of such a diagnosis, treatment should begin immediately. The treatment should be 3 cc. per animal for the initial injection; 4 cc. each as the second dose, administered five to seven days following the first; and 5 cc. per cow as the third dose, given five to seven days later. All injections should be administered subcutaneously.

Following this treatment series, the cows should be retested within one or two weeks to determine any animals which are still infected. All positive cases should receive another treatment series, the dosage at this time being increased to 6 cc., then to 8 cc., and finally to 10 cc. per animal, with the same intervals between dosages. Following this series, another microscopic examination should be made to determine the condition. It may be advisable to eliminate those which remain infected at this time.

Realizing that many cases of mastitis are treated by the general practitioner with no laboratory report as to the type or types of organisms, I believe *Staph. aureus* toxoid should be administered routinely in the treatment of clinical mastitis.

One extreme variation from the general belief is that concerning the period which must elapse following treatment, to deter-

TABLE 3—Herd 14

Cow	Type of infection	cc. per treatment series	Results following treatment
Red	Staph.	3, 4, 5	neg.
Nigger	mixed*	3, 4, 5	neg.
18	mixed	3, 4, 5	Staph. (retest)
Brindle	mixed	3, 4, 5	neg.
13	mixed	3, 4, 5	Str.
11	mixed	3, 4, 5	neg.
Daisy	lt. Staph.	3, 4, 5	neg.
14	lt. Staph.	3, 4, 5	neg.
12	Staph.	3, 4, 5	mixed
4	light mix	3, 4, 5	neg.
Brownie	mixed	3, 4, 5	neg.
5	mixed	3, 4, 5	no retest
Maroon	Staph.	3, 4, 5	neg.
Ruby	mixed	3, 4, 5	neg.
202	lt. Staph.	3, 4, 5	neg.
229	mixed	3, 4, 5	neg.
Blackie	Staph.	3, 4, 5	no retest
2	neg.	.....	neg.
15	Staph.	3, 4, 5	light mix
17	Staph.	3, 4, 5	light mix
7	mixed	3, 4, 5	very light mix
6	Staph.	3, 4, 5	neg.
16	mixed	3, 4, 5	neg.
9	Staph.	3, 4, 5	no retest
10	mixed	3, 4, 5	neg.
La Estrellita	mixed	3, 4, 5	lt. Staph.
19	lt. Staph.	3, 4, 5	neg.
8	lt. Staph.	3, 4, 5	neg.
1	lt. Staph.	3, 4, 5	neg.

\*Staphylococcus and Streptococcus.

mine actual curative results. It has been suggested by many of the authorities on mastitis that an udder should remain negative for several weeks following treatment before it is considered "cured"—void of infection. However, realizing that no immunizing agent has yet been developed against mastitis, and understanding the possibility of contact infections and a much shorter incubation period, I believe this theory is incorrect. However, other toxoids have exhibited immunizing abilities against specific infections; therefore, it appears reasonable that this toxoid may hold equal possibilities.

#### SUMMARY

This report includes approximately 200 cows. A composite milk sample from each animal was prepared and microscopically examined. Of these animals, 104 were infected with both streptococci and staphylococci bacteria. Staphylococci infection, only, was demonstrated by 89 cows. Every animal recovered clinically. Approximately 100 of these were retested microscopically. Only 20 cows remained positive, of which 12 showed a mixed infection, and 8 only a staphylococci infection. These 20 cows have received additional toxoid therapy, but at the date of this writing all of them have not been retested microscopically.

Other aids in mastitis treatment and control accompanying therapeutics are essential. Proper milking and sanitary techniques must be followed by the dairyman—the dipping of teat cups, proper cleansing of udders, proper arrangement of milking strings as to heifers, older animals, previously infected animals, and, last, the infected animals, which should be milked by hand. General cleanliness is essential.

This report does not offer any conclusive evidence as it is not a completed experiment. But it may possibly introduce a new technique in the therapeutics of staphylococci mastitis in the dairy cow.

#### Trichomoniasis

In the control of trichomoniasis in a dairy herd, each cow should skip three heat periods without service. No treatment will then be necessary if a clean bull is used. Trichomoniasis can be eliminated from a herd in this way.

• • •

Recent treatments of trichomonad-infected bulls include the use of trypanflavine salve. Another treatment consists of injecting sodium iodide intravenously at the rate of 30 Gm. per 1,000 lb. of body weight. If this is done four or five times at three-day intervals, some bulls have been reported to have recovered from infection.—*D. E. Bartlett, D.V.M., Minnesota.*

#### Distemper Prophylaxis\*

A very real criticism which can be leveled against the numerous papers on this subject is that they are one-sided: They all commend distemperoid virus. This is misleading, because there is abundant, vocal criticism of this product, although none of it has been reduced to print. There must be a reason for this subtle but definite difference—all the favorable comment in writing, all the unfavorable vocal. We need a careful, comparative trial of the several methods of distemper immunization which will evaluate the strong and the weak links in each system.

Progress is made by an offensive approach. In a military sense, the heavy artillery and the best troops should be concentrated at the point of weakness and of proposed advance. Is this being done in veterinary medicine?

Fracture fixation has been championed by such orthopedic-minded veterinarians as Schroeder, Stader, and Ehmer. Surgical procedures may be exemplified by the work of Secord, Blakely, and Munson in the repair of diaphragmatic hernia. But what of virology?

The dog suffers from a number of virus diseases, having similar clinical manifestations—canine distemper, fox distemper, infectious hepatitis, and possibly a true encephalitis. The viruses of these diseases, and the bacteria associated with them as secondary invaders, are responsible for a high rate of morbidity and mortality. Yet Dean Hagan reports that there is no recognized treatment which will alter the course of an established virus disease. Treatment with drugs, biological products, and antibiotic agents serves only to control the bacterial secondary invaders—it has no effect upon the primary virus infection. Conversely, and thinking in terms of immunity, many virus infections confer a permanent and solid immunity, while all immunity resulting from bacterial infection is relative and temporary.

Faced with this double-barreled problem that virus diseases do not yield to treatment while they may be effectively prevented by immunization, the need for determining the best immunization procedure assumes the key position in the advance of small animal medicine. It is at this point that an advance should be made. Therefore, all experience dictates that research efforts be concentrated on this problem.

These efforts should begin with an impartial comparison of the immunizing

\*This is a condensation of the paper presented by Dr. Edgett during the exercises dedicating the West Wing of the Ontario Veterinary College on July 5, 1948.

agents now available and in common use.

Such a test should be conducted as promptly as possible. It cannot be done effectively by commercial firms or the producers of the biological products being tested, nor yet by practitioners. It can be done most effectively by our veterinary colleges, and it should be done on a wide program sponsored by the Research Council of the American Veterinary Medical Association.—James A. Edgett, D.V.M., West Hartford, Conn.

### Notes from the 4th International Congresses on Tropical Medicine and Malaria—May 10-18, 1948\*

*Electron microscopy* has now developed to the point where it can reveal details of macromolecular dimensions in many forms of living matter. For example, suspensions of purified viruses in bacteria, in products of the interaction of bacteria and hyper-immune serums, and in the bacteriophage as it develops from the susceptible organisms which it invades.—R. W. G. Wyckoff, U. S. A.

*Q Fever*.—The blood and sputum of infected patients have been shown to be constantly infected even after filtration. Convalescents do not have neutralizing antibodies in the blood serum. Nevertheless, human beings and animals develop a strong immunity which persists for long periods. Guinea-pig inoculation represents a direct and rapid method of diagnosis for epidemiologic investigations.—J. Caminopetros, Greece.

*Rabies Control*.—The measures necessary for the eradication of rabies from domestic dogs have been known for more than one hundred years. They are measures which prevent any dog from biting another while the disease is latent. The essential regulations include: (1) licensing of dogs; (2) taxation of their owners; (3) seizure and destruction of ownerless dogs; (4) quarantine of all owned dogs while rabies prevails and for at least six months after the last reported case; (5) the subjection of all imported dogs to quarantine for six months; (6) vaccination of dogs by the single injection method. Rabies in wild animals may be combated by hunting and trapping.—H. N. Johnson, U. S. A.

*Hookworm Anemia*.—Results show that a nutritional deficiency is closely associated with hookworms in the production of an-

emia. Special importance is attached to the reduction of the iron reserves. Therefore, hookworm disease cannot be considered as a simple helminthiasis, but primarily as a deficiency disease and should be called hookworm anemia.

Prophylaxis must consist primarily of the periodic administration of iron without relation to attempts to prevent infection, and the treatment of severe hookworm anemia must begin by the restoration of the hemoglobin level by iron therapy.—W. O. Cruz, Brazil.

*Equine Trypanosomiasis*.—*Trypanosoma hippicum*, the cause of murrina in Panama, may be spread by any mechanical means which applies a quantity of fresh blood from an infected animal to an open, moist wound in the skin or mucous membranes of another animal. Common portals of entry are insect bites, thorn and wire injuries, harness and saddle galls, and rope burns. Insects, however, appear to play a major rôle in its transmission. Vampire bats appear to be an important factor.

Clinically, the disease is marked by fever, progressive emaciation, anemia, faint icterus, rough coat, and edema of the most dependent part of the abdomen, but with no impairment of appetite at any time. Late in the illness, there is marked weakness of the posterior extremities and the animal walks with a stiff, staggering gait.—H. C. Clark, Panama.

*Anaplasmosis*.—Animals recovered from an attack of anaplasmosis are resistant to further attacks, but they remain as carriers of the disease for many years.—G. Dikmans, U. S. A.

*Flies As Disease Carriers*.—The rôle of flies as vectors of disease and as pests to man and animals is of such economic importance that the control of this group of insects is one of the most urgent, entomological problems in practically every country of the world. Although the use of DDT and other new insecticides has made it possible to effectively control many species of flies, these agents are far from being a panacea for our fly problems.—W. G. Bruce, U. S. A.

*Toxicology of Insecticides*.—The extensive use of such insecticides as the chlorinated compounds, the *gamma* isomer of benzene hexachloride, chlorinated camphene, and chlordane, present toxicologic problems which must be considered from the viewpoint of long range effects.—A. J. Lehman, U. S. A.

\*The Congresses were held in Washington, D. C.

### A Sitting Hereford

The accompanying pictures show an unusual position frequently assumed by this calf. The owner, Mr. W. P. Kidd, Lawrenceburg, Tenn., reports that she often does this voluntarily, and that she can be



Front view of sitting Hereford.

made to rise to this position if found lying down.

Ordinarily, the calf lies down again before trying to rise to all four feet, and when getting into the standing position rises in the normal bovine manner, hind



Side view, showing position of legs.

feet first. Once, when urged to stand from the position illustrated, the calf tumbled end over end and then rose in the normal manner.—H. W. Nance, D.V.M., Lawrenceburg, Tenn.

### The Long-Time Effects of Thyroprotein

Four Holstein-Friesian and 3 Guernsey cows were selected from the herd of the West Virginia Agricultural Experiment Station for a study of the long-range effects of the feeding of thyroprotein. Several of these cows were fed thyroprotein through two lactations and the results are approximately as follows:

**Udder Trouble.**—The Holstein-Friesians showed no signs of mastitis, but all 3 of the Guernseys developed mastitis when fed thyroprotein. There was no evidence of mastitis in other Guernsey cows in the herd.

**Lung Trouble.**—Only 1 of the cows, a Guernsey, appeared to be so highly stimulated by thyroprotein that there was reaction in respiratory rate and an increase in the heart beat as well as in the body temperature. She never completely recovered from these effects and after freshening became worse and was sold.

**Reproduction.**—Although it is not customary to feed thyroprotein until after the cows have been re-bred, some of these animals were fed thyroprotein about two months after freshening. Among this group, 2 developed hard, large, tough cysts on their ovaries which interfered with breeding efficiency.

**Loss of Flesh.**—There was a definite loss in weight in all 7 animals receiving thyroprotein. Extra grain allowance might have reduced this loss, but it indicates that, of itself, thyroprotein does not increase production.

Although these experiments are not sufficient on which to base general conclusions, it is evident that thyroprotein interferes with the general body metabolism, and the investigators (Hyatt and Henderson, *Holstein-Friesian World*, Aug. 21, 1948) recommend that better methods of feeding and management will do more to increase production, without interfering with the health of the animals, than will the feeding of thyroprotein.

Some degree of clinical mastitis was found in 23 per cent of all cows examined in 300 herds (7,000 cattle). Fifty per cent of these cows had bacteria associated with the mastitis.—M. G. Fincher, New York.

**Treatment of Skin Ailments in the Dog.**—Tetraethylthiuram monosulfide is reported to be nonirritating to the skin, to cause a relatively rapid cure, and to stimulate the growth of hair in dogs suffering from mange and other skin conditions.—*North Am. Vet.*, 29, (June, 1948): 355-358.



## Errors in Management and Veterinary Practice

This case report stresses the important relationship between errors in management and veterinary practice. The owner of a flock of 500 feeder lambs telephoned that he had 190 dead lambs on his pasture. On closer questioning, it was found that 500 lambs had been pastured on irrigated birdsfoot trefoil for six weeks with insignificant losses. The lambs were moved from this pasture for two and a half days, so that 200 of them could be sheared, and were on dry feed or in the shearing corral with no food during this time. At 7:00 p.m., they were replaced, unfed, in the birdsfoot trefoil pasture and the following noon 190 were found dead.

In considering the various conditions which might have caused these losses, many additional facts were obtained. Anthrax was considered, as it was the beginning of the season when it might occur, but was eliminated by subsequent laboratory investigation.

At the owner's insistence, poisoning was considered. This was abandoned because there had been no crop-dusting in the area, and because no remains of poison could be found on the premises. Laboratory tests performed later failed to show the presence of heavy metals.

Accidental grain founder was easily eliminated because the lambs were not in, or near, grain stubble and postmortem examination showed only green feed in the gastrointestinal tract.

The final conditions to be investigated were those attributed to mismanagement, that is, bloat and overeating. Under careful questioning, the owner revealed that the lambs were held on dry pasture and in the shearing pens for two and a half days with water and no supplemental feed. The owner, after returning them to the trefoil pasture, watched them carefully for bloat until nightfall. No evidence of bloat was noticed at that time. It was the following noon that 190 lambs were found dead, all together, in the bedding area with no signs of struggle. Some of them had the skin torn open from rumen distention.

It can be assumed with reasonable certainty that the cause of these losses was overeating, with rumen paralysis and bloat. Even though these animals had been on birdsfoot trefoil pasture for six weeks without losses, they were unable to cope with a sudden return to this lush feed after a two-and-a-half day fast. The more robust lambs in the flock were the ones

that died, and shearing had no connection with the loss.

Veterinary medicine, no matter how well organized, cannot protect owners against such serious mismanagement practices.—*J. A. Howarth, D.V.M., University of California, Davis, Calif.*

## Foot Rot in Cattle

In a controlled experiment (*Cornell Vet.*, 38, April, 1948: 122-129) it was concluded that a single treatment of sodium sulfapyridine, sodium sulfamerazine, sodium sulfamethazine, or the oral administration of sulfapyridine, did not indicate that sulfonamide therapy for foot rot is greatly superior to former methods used in treatment. The authors further concluded "There is as yet no specific treatment for foot rot; each case must be treated individually by general or local treatment, or a combination of methods decided upon by the veterinarian."

## Duration of Brucellosis Immunity

Estimates by experiment stations and the BAI on the duration of the protection or immunity engendered by *Brucella* vaccination has been too conservative (*Successful Farming*, 1948). Based on questions to breeders and dairymen, the conclusion reached by the author, D. J. Carter, is that many times protection is lifelong. Many dairymen and their veterinarians believe that a lifelong immunity is developed in calves that are vaccinated between the ages of 6 and 12 months.

## Inapparent Virus Infections

The inapparent virus infections suggest a possible solution of many a problem of epizootiology. The virus carrier that is capable of transmitting infection to susceptible species has been recognized in the field of investigation. The human carrier of Carré's virus, the sheep and cattle carrier of hog-cholera virus, and the hamster carrier of the virus of human influenza are so many proved examples of inapparent or subclinical disease. The unknown factor is the inhibiting agent. It may be more simple than the complex biologic phenomena sought to clarify this type of infection.

Ethics are those rules which govern our professional conduct and relationships with fellow veterinarians, other professional men, and clients.—*K. W. Smith, D.V.M., Iowa.*



# An Experimental Basis for Amino Acid Therapy in Canine Practice

O. H. SIEGMUND, D.V.M., and E. J. MORRISON, D.V.M.

*Rensselaer, New York*

SEVERAL papers have appeared recently in journals recounting various clinical experiences with parenteral and oral types of amino acid mixtures. Since there is a growing interest in these nutrition and therapeutic aids, a sound experimental foundation is needed for future clinical applications. This paper aims to help establish such a foundation and to report dosage and modes of parenteral administration of protein hydrolysate preparations.

Protein hydrolysate preparations have been on the market for human use for several years and have achieved wide acceptance. However, the dog has been an extremely important experimental animal, both in the development and in the standardization of these products. The discovery of threonine and its indispensability to the animal system by McCoy, Meyer, and Rose,<sup>1</sup> and the experiments of Rose and Rice<sup>2</sup> and Madden<sup>3</sup> in maintaining nitrogen balance, represent only a small part of the enormous data on animal experiments that have accumulated. Full use has not yet been made of this information by the professional man who could apply it most directly, *i.e.*, the doctor of veterinary medicine.

The veterinarian is often faced with clinical problems in which hypoproteinemia is a complicating factor, or in which protein depletion develops after surgery or prolonged illness. The experiments described in this paper deal with the effects of parenteral injections of protein digests, which have a direct bearing on the many-sided problems of shock and clinical hypoproteinemia. If the animal body can be enabled to maintain a positive nitrogen balance and to produce new plasma proteins by the administration of protein hydrolysates, this procedure may be as valuable as, and much more simple than, intravenous injections of plasma.

In the normal animal, amino acids derived from the diet are absorbed from the gastrointestinal tract, and utilized in part

for the synthesis of body proteins. It seems logical to assume that a complete mixture of amino acids administered parenterally should be metabolized in the same manner. The parenteral route becomes especially important when the gut is altered by pathologic or surgical processes, or its physiology impaired by starvation and malnutrition, or when appetite is seriously lacking. Lusk<sup>4</sup> has shown that amino acids are not stored as utilizable protein for any appreciable time. According to Schoenheimer's principle,<sup>5</sup> proteins are an integral part of functioning tissue; that is, protein breakdown in the organism is counter-balanced by protein synthesis. It is evident, therefore, that should protein breakdown exceed protein synthesis from dietary amino acids, a rapid and efficient method of supplying additional amino acids would be required. Protein hydrolysates appear uniquely fitted for this need.

## EXPERIMENTAL

The first portion of this investigation dealt with maintaining a positive nitrogen balance by administration of a complete mixture of amino acids prepared by casein hydrolysis. Test animals were 5 adult female dogs. They were kept in individual metabolism cages and nitrogen balance studies were carried out by the procedure previously reported by Kade, Houston, Krauel, and Sahyun.<sup>7</sup> A casein hydrolysate was administered as practically the sole source of nitrogen, and was given either orally, intravenously, or intraperitoneally with the remaining dietary constituents being fed orally. The protein hydrolysate used throughout these experiments was parenamine, an acid hydrolysate of casein.\* Both the 6 and 15 per cent solutions were employed, the 15 per cent, however, being diluted to 5 or 6 per cent before use. At the beginning of each experiment, the animal was fed for two weeks on a 6 per cent casein diet supplemented with methionine. The casein and methionine were then replaced by the acid hydrolysate fortified with tryptophane (given orally) for one or more weeks. Subsequently, this preparation was injected either intravenously or intraperitoneally for seven-day periods, respectively. Throughout this experiment, the dogs were fed a protein-free diet supplying approximately 80 calories per kilogram of body weight per day.

\*Manufactured by Winthrop-Stearns, Inc.

From Biology Division, Sterling-Winthrop Research Institute, Rensselaer, N. Y. Dr. Morrison is now state veterinarian at Lansing, Mich.

Presented before the Section on Small Animals, Eighty-fifth Annual Meeting, American Veterinary Medical Association, San Francisco, Calif., Aug. 16-19, 1948.

The authors thank Dr. C. F. Kade for his technical advice.

In an experiment first reported by Sahyun *et al.*,<sup>8</sup> an effort was made to determine the minimal nitrogen intake requirements to maintain positive nitrogen balance with the 6 per

Three additional animals were put on test, using somewhat higher nitrogen intakes. In these three experiments, however, a 15 per cent casein hydrolysate fortified with tryptophane†

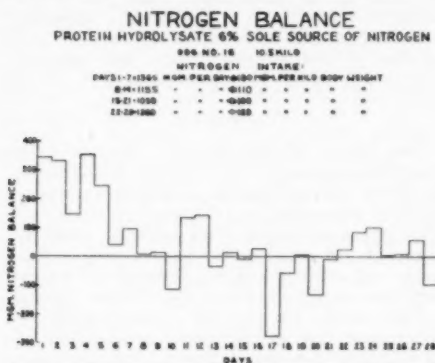


Fig. 1—Dog 16, 10.5 kg. Nitrogen balance with an acid hydrolysate of casein (6%) as the sole source of nitrogen. Nitrogen intake: Days 1-7 = 130 mg. per kilogram; days 8-14 = 140 mg. per kilogram; days 15-21 = 100 mg. per kilogram; days 22-28 = 120 mg. per kilogram. Oral administration.

cent casein hydrolysate. The data are presented in figure 1. An initial level of 130 mg. of nitrogen per kilogram of body weight (50 mg./lb.) per day was administered orally. During the second week, the intake level was reduced to 110 mg. of nitrogen per kilogram per day. The animal remained in positive balance. For the third week, the intake level was lowered to 100 mg. At this level, more nitrogen was excreted than taken in. Consequently, the nitrogen intake was raised to 120 mg. per kilogram for the fourth week, with a return to positive balance. It can be seen that 110 mg. of nitrogen per kilogram per day was sufficient to maintain the animal in positive nitrogen balance with a 6 per cent casein hydrolysate\*\* as the sole source of nitrogen.

Figure 2 shows the nitrogen levels in an experiment similar to that in figure 1. A nitrogen intake of 110 mg. per kilogram of body weight was administered orally each day for one week, resulting in positive balance. This was reduced to 100 mg. of nitrogen per kilogram for the second week. The chart shows the promptness of onset and the degree of negative balance. For the third week, the nitrogen intake was further reduced to 90 mg. per kilogram per day, which produced an even greater negative balance. However, as soon as the animal was returned to the 110-mg. nitrogen level per kilogram per day (third week), there was a prompt return to positive balance.

\*\*Parenamine, 6 per cent, Winthrop-Stearns, Inc.

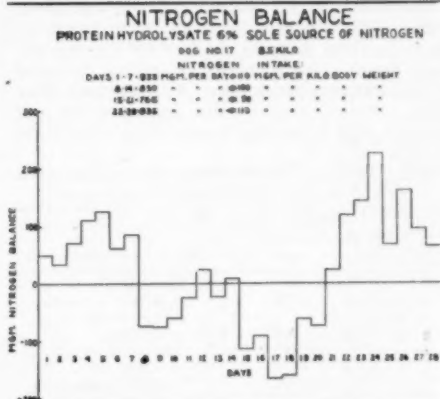


Fig. 2—Dog 17, 8.5 kg. Nitrogen balance with same hydrolysate as in fig. 1. Nitrogen intake: Days 1-7 = 110 mg. per kilogram; days 8-14 = 100 mg. per kilogram; days 15-21 = 90 mg. per kilogram; days 22-28 = 110 mg. per kilogram. Oral administration.

was administered both parenterally and orally. The results are shown in figures 3, 4, and 5. Although there are days of negative nitrogen balance, these are the usual variations obtained with normal adult animals and the over-all picture is one of good positive balance.

It was felt that the slow intravenous administration of amino acids necessary to avoid emesis would present a definite disadvantage to the practitioner. Consequently, the possibility of intraperitoneal injection was inves-

†Parenamine, 15 per cent, Winthrop-Stearns, Inc.

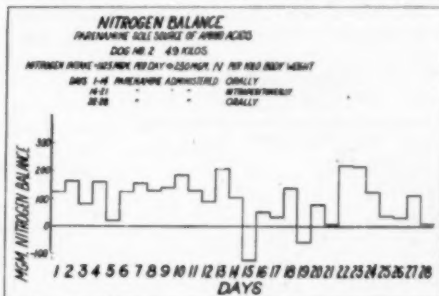


Fig. 3—Dog 2, 4.9 kg. Nitrogen balance with acid hydrolysate of casein fortified with tryptophane as sole source of amino acids. Nitrogen intake: 230 mg. nitrogen per kilogram. Days 1-14, oral administration; days 15-21, intraperitoneal administration; days 22-28, oral administration.

tigated. This was carried out as rapidly as possible, by means of a Shikles intravenous pump, in order to observe the effects of rapid injection. Doses were calculated on the basis of 110 mg. of nitrogen per kilogram per day as a minimal level for positive balance, and these doses were doubled and injected in equal amounts twice daily (a total of 440 mg./kg. per day) for an average of six injections, in order to approximate doses that might be used clinically. This procedure was employed since it was felt that such large doses would cover most

parenamine was used as it came from the bottle in a dose of 14 cc. per pound, or the commercial 15 per cent solution was diluted to 6 per cent by adding 150 cc. of sterile physiologic saline to a 100-cc. bottle of 15 per cent parenamine and injecting in the same dose. The results are shown in table 1. It is immediately apparent that despite the large doses given, and the rapidity of the injection, very few animals evinced any symptoms of discomfort.

## DISCUSSION

The value of supportive treatment in hastening recovery is generally recognized. However, the activation of vigorous recuperative processes is dependent upon an optimum nutritional level and the maintenance of a normal or positive nitrogen balance. In addition, it is frequently necessary to supply nitrogen for tissue repair.

The value of protein hydrolysates in these cases lies in the ready availability of its nitrogen for this purpose. Furthermore, as Elmann and Lischer<sup>6</sup> point out, the introduction of nitrogen as protein hydrolysates is often more beneficial than the administration of mixtures of plasma proteins. This is of considerable importance in cases of acute and chronic hemorrhage wherein large volumes of plasma proteins are lost. Elmann *et al.*<sup>6</sup> report that in dogs rendered acutely hypoproteinemic by severe hemorrhage, results obtained with hydrolyzed protein solutions approach or equal those obtained with citrated plasma. It would seem that the injected polypeptides and amino acids enable the liver to synthesize protein rapidly and thereby to replace the lost albumin and globulin.

It should be remembered that while these experiments were carried out on dogs in apparent good health, the results obtained are applicable to clinical problems. The determination of relative biological value of protein hydrolysates in normal and nitrogen-depleted dogs is most important.

TABLE 1—Effects of Rapid Intraperitoneal Administration of a 6 per cent Casein Hydrolysate

Dog (No.)	Weight (kg.)	Hydrolysate injected-cc.*	Time (Min.**)	Reactions
1	18.8	512	2.4	none
2	10.2	278	1.4	slight mucous emesis
3	11.8	321	1.5	none
4	13.2	359	1.7	none
5	12.5	340	1.6	none
6	10.0	272	1.3	salivation
7	14.3	389	1.9	none
8	9.2	250	1.9	none
9	11.7	318	1.5	belly tense for some time
10	13.4	365	1.7	none
11	10.2	278	1.3	none
12	10.8	294	1.4	none
13	12.5	340	1.6	none
14	8.9	242	1.2	some discomfort for 30 min.
15	19.0	517	2.5	none

\*These amounts were injected twice daily (8 a.m., 3 p.m.) for an average of six injections.

\*\*Total time of each injection, equaling approximately 3.5 cc. per second in each case.

clinical contingencies, such as the provision of sufficient nitrogen for protein replacement as well as for the maintenance of a positive balance. Since a 6 per cent solution of the hydrolysate was used with a nitrogen content of 8 mg. per cubic centimeter, the dose administered equaled 27 cc. per kilogram, or approximately 14 cc. per pound. The dosage schedule was very simple: The commercial 6 per cent

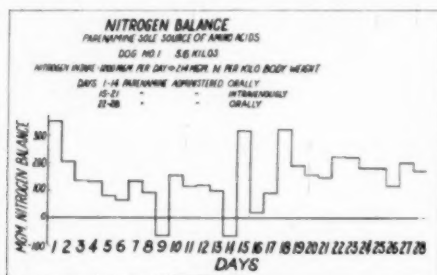


Fig. 4—Dog 3, 16.3 kg. Nitrogen balance with same hydrolysate as figure 3. Nitrogen intake: 236 mg. nitrogen per kilogram. Days 1-21, oral administration; days 22-28, intravenous administration; days 29-33, oral administration.

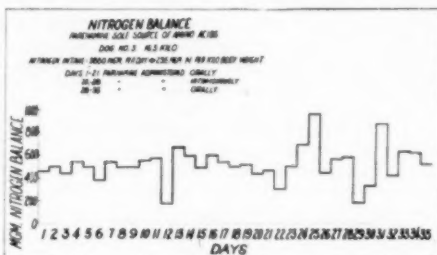


Fig. 5—Dog 1, 5.6 kg. Nitrogen balance with same hydrolysate as figures 3 and 4. Nitrogen intake: 214 mg. per kilogram. Days 1-14, oral administration; days 15-21, intravenous administration; days 22-28, oral administration.

Seeley<sup>10</sup> found that casein supplied as the sole protein gave a biologic value of 0.81 in normal dogs and a value of 0.97 in depleted animals, showing a distinctly greater utilization in the hypoproteinemic dog. It would appear that a negative nitrogen balance leads to improved protein utilization and increased protein retention.

Table 1 shows the results of rapid par-enteral administration of an amino acid solution. The primary purpose of these experiments was to test a simple and rapid method of administration especially suited for veterinary use, and to discover any deleterious effects which rapid injection might engender. The very low incidence of untoward reactions indicated that the intraperitoneal route offers a quick means of administration, requiring only one assistant and no special equipment. Young<sup>11</sup> has reported good results with oral administration using a 15 per cent casein hydrolysate, which he administered with a dose syringe. This method has the advantage of not requiring aseptic technique, and also that mixtures of vitamins or other agents can be given simultaneously. Brinker,<sup>12</sup> at Michigan State College, has used up to 300 cc. per day, subcutaneously, of a 6 per cent amino acid solution with good results and without observing any deleterious side effects. In a large number of these latter cases, appetite was reported to have returned to normal two or three days after amino acid therapy was begun.

#### SUMMARY

1) The desirability and feasibility of protein hydrolysate administration as a valuable supportive treatment is discussed.

2) Five experimental dogs were kept in positive nitrogen balance during the administration of purified diets wherein the sole source of nitrogen was from fortified acid hydrolysates of casein.

3) The protein hydrolysates were given both orally and parenterally at levels varying from 90 mg. to approximately 200 mg. of nitrogen per kilogram of body weight. It was determined experimentally that 110 mg. of nitrogen per kilogram per day represented the minimal intake for the maintenance of positive nitrogen balance.

4) Intraperitoneal injection is shown to

be a simple, effective, and rapid means of administration for the practitioner. Subcutaneous and oral administration are acceptable alternative routes.

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- <sup>12</sup>Brinker, W. P.: Personal communication.

#### Syngamosis Treated with Intratracheal Insufflations

Ninety-five per cent of chicks suffering from gapes (*Syngamus trachealis* infection) responded to insufflation of the trachea with finely pulverized pyrethrum. The powder was contained in an insufflator mounted with a rubber tube. The chick's beak was opened and the larynx pressed forward from outside. Delicately, the tube was passed through the larynx and a puff or two of the powder quickly blown into the trachea. Two or three treatments were given on consecutive mornings. — *Rev. d'Élevage et de Méd. Vét.*, **1**, (Jan.-March, 1947): 53.

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# NUTRITION

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## Relationship of Nutrition to Fertility in Animals

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ONE OF THE most baffling problems confronting livestock producers, veterinarians, and research workers today is that of sterility or reduced fertility. Whether this problem is becoming more formidable now than it was in the past, or whether we are becoming more conscious of it as our methods of raising animals become progressively more specialized, is not known. It may be that with our greater specialization and attempts to increase efficiency of animal raising by breeding, feeding, and various tactics of management, we are removing the animal from his native habitat more abruptly than he can make the necessary adaptations, many of which are probably impossible.

### INFLUENCE OF ENVIRONMENT

The livestock industry has experienced variations of economic significance in the reproductive output of domestic animals which appear to be attributable to environmental conditions. In nature, the increase and reduction of the population of various species corresponding with favorable and unfavorable environmental conditions have resulted in much speculation as to the causes.

A number of interesting examples of periodic increases in creative energy have been pointed out.<sup>1,2</sup> One of the best examples of the cyclic scheme in animal numbers is to be found in the lemming, an animal indigenous to Scandinavia. Every few years, this animal becomes so abundant that the young migrate in all directions; those which encounter the sea swim until they are exhausted and drown. Other data, given by the records kept by the Hudson Bay Company of the number of skins from various animals, show similar cycles of abundance and scarcity of muskrat, Canadian rabbit, skunk, fisher, mink, wolverene, marten, and various foxes.<sup>3,4</sup> The large numbers recorded for certain years were believed to be

due to an increased reproductive rate. The Canadian rabbit, in "bad" years, produced but one litter of 3 young; whereas, in good years, it produced two or three litters of about 8 to 10 per litter.

It appears that when conditions are favorable for the growth of plants, plenty of food is supplied to the herbivorous animals which, in turn, furnish a supply of food for the carnivorous animals, resulting in increased numbers. Huxley,<sup>5</sup> who summarized these observations, pointed out that no animal changes its reproductive capacity, *i.e.*, either in number of broods per year or in number of young per brood, provided that really uniform conditions are maintained. He also pointed out that it is possible to improve environmental conditions, especially temperature and food, in such a way as to increase reproductive efficiency. The response of wild and domestic animals to the supply of food is so definite that it seems that nature, in an attempt to ensure species survival, has provided animals with a protective mechanism for either reducing or ceasing reproduction under adverse conditions.

Although our immediate interest is in domestic animals, the foregoing points will serve to introduce a discussion of some of the more specific effects of nutrition upon reproductive performance. Information on this subject is amazingly difficult to condense and analyze. The reasons for this seem to be that: (1) Only a few nutrients exert a definite direct effect upon fertility. (2) In many cases of reduced fertility seemingly attributable to nutritional failure, the cause appears to be indirect with the mechanism involved often obscure. (3) In a number of cases, animals may well be suffering from multiple deficiencies, therefore, presenting a confounded picture. (4) Some reduced fertility believed to be of nutritional origin may well be caused by light, humidity, temperature, or some other environmental influence. (5) Insufficient data are found which are derived from carefully controlled experiments. (6) Many existing conclusions relative to the effect

<sup>1</sup> Presented before the New York State Veterinary Medical Society, July 8, 1948.



of dietary factors upon fertility are frequently based upon limited data—too often upon a single case history. (7) Occasionally, a symptom or a group of symptoms manifested by one species is attributed analogically to a dietary deficiency which is known to cause similar symptoms in an entirely different species. Few, if any, fields of study entertain more opinions with less collaborative evidence to support them than that dealing with sterility.

#### INFLUENCE OF NUTRITION

Although it is conceivable that malnutrition—either in kind or amount of feed—may influence the reproductive performance of animals in many ways, a clear-cut deficiency of a single nutrient is seldom found under practical conditions. At one time or another, claims have been made that almost every known food factor is indispensable for normal reproductive function. In so far as reproductive performance is associated with general health, these claims may have some degree of validity.

If we attempt to determine the additional feed needs for reproduction above those necessary to maintain good health in mature animals and normal growth in the young (excluding the lactation requirements) from the results of well-controlled experiments, we find that none is needed, with, possibly, a couple of not too well-substantiated exceptions.<sup>57</sup> There are reports of infertility occurring on deficient pastures and on restricted diets under natural conditions, but, in these instances, no evidence is given that the requirements for breeding are different from those for growth and maintenance. Naturally occurring deficiencies are generally multiple in nature, such as a protein deficiency accompanying one of phosphorus in pasture grass. In order to point out certain relationships of nutrition to fertility in various species, the data will be presented for various nutrients or nutrient groups.

#### LOW PLANES OF NUTRITION

It is practically impossible to conduct an experiment that will demonstrate the effects of a deficiency of a single food factor without encountering at least partial inanition. This is not quite so true for ruminants as it is for monogastric animals. Animals on deficient diets generally eat less than the control animals receiving a complete diet. In order that comparable situations may be established, the control animals are often limited to approximately the same energy intake as the experimental

animals. Interpretation of these data is often difficult because almost all cases of nutritional deficiency effects in animals are confounded with the effects of low energy intake. The converse is frequently true, also.

Marked adverse effects upon the fertility of animals have been attributed to inanition. A decrease in energy intake of 15 to 30 per cent below what rats consume voluntarily results in (1) retarded growth of young rats or loss of weight in the mature animal, (2) cessation of estrus, (3) ovulation failure, (4) atrophic testicles, (5) lack of motile spermatozoa, (6) priapism, and (7) loss of sexual libido as physical debility increases. In an experiment with rats conducted by Asdell and Crowell,<sup>58</sup> sexual maturity or puberty, as determined by the appearance of first heat, was delayed when body weight was held constant after growth to certain levels. A smaller proportion of the rats receiving restricted energy intakes were anestrus at 29 months of age than of those receiving full feed. Others<sup>59</sup> have reported that the appearance of estrus in rats may be suppressed for as long as 375 days as a result of inanition.

Moore and Samuels<sup>110</sup> showed that degrees of inanition which have no effect upon the testes of rats may suppress male sex hormone production with resultant atrophy of the prostate and seminal vesicles. Smaller than normal ovaries, with a marked inhibition of follicular maturation during the latter stages and a decreased production of ovarian hormone, were attributed to inanition.<sup>111</sup>

Other studies have suggested that inanition causes insufficient pituitary activity.<sup>106, 112</sup> Mullins and Pomerantz<sup>113</sup> found that inanition and hypophysectomy caused similar effects upon various endocrine glands. Sykes *et al.*<sup>114</sup> found that restricted diets fed to rats resulted in a delay in the time of vaginal opening (similar to that found by Asdell and Crowell<sup>58</sup>) and a reduction in the number of pregnancies. Guinea pigs appear to be equally susceptible to low energy intakes.<sup>106, 115</sup> The effects of inanition bearing upon fertility are more pronounced in immature than in mature animals.

Few investigations have been reported on the effect of inanition on fertility in livestock.

Richter<sup>116</sup> reported the occurrence of delayed heat in heifers which he attributed to a lack of feed. Others<sup>8, 117</sup> have found a similar situation which appears to be more prevalent near the end of a severe winter and is apparently remedied when animals are given access to pasture grass. The major influence of a low nutrient supply upon fertility in mature animals appears to be manifested in irregular heat periods and in a failure to conceive.<sup>118</sup>

Jones *et al.*<sup>26</sup> showed that rations which are satisfactory for normal growth of bulls to 3 years of age are adequate for normal reproductive performance. Recent Cornell investigations,<sup>10, 26</sup> in which digestible nutrient levels of 100, 120, and 140 per cent of the Morrison dry cow maintenance requirements<sup>21</sup> were fed to breeding bulls, demonstrated that neither the quantity nor quality of the semen produced nor the fertility of the bulls was related to the digestible nutrient intake within the limits studied. However, body weight differences were observed. Jones *et al.*<sup>27</sup> found that bulls fed alfalfa hay supplemented with 1 lb. each of skim milk powder and oat groats daily grew faster, matured earlier, were in better condition, and produced good quality semen earlier than bulls receiving a basal ration of hay supplemented with salt, phosphorus, and iodine. These differences were attributed to the greater energy intake rather than to the quality or quantity of protein ingested. Studies made of the ram<sup>28, 29, 137</sup> and boar<sup>137</sup> indicate that low plane of nutrition restricts reproductive function in these species, also.

#### HIGH PLANES OF NUTRITION

Since the effects of underfeeding upon fertility are quite marked and well-established in a number of species, it is paradoxical that a high level of feeding, resulting in fatness or "high condition," is often accepted as a cause of sterility.<sup>107</sup>

A prevalent opinion seems to be that high conditioning results in reduced fertility, though many holders of this opinion proclaim the essentiality of flushing sheep. These two ideas are incongruous unless it is believed that a high intake for a short period favors fertility, but that over an extended period, sterility is encouraged.<sup>27</sup>

Numerous data support the high degree of fertility associated with flushing of sheep. This practice is successful when the gain in weight is significantly greater than that in unflushed ewes,<sup>30, 31, 138</sup> and when the level of feeding before flushing is below that which would result in an optimal lamb crop.<sup>32, 33</sup> The flushing of ewes already in high condition does not cause reduced fertility.<sup>33, 34</sup>

Hart and Miller<sup>35</sup> were able to increase the lamb crop of range ewes from 80 per cent to an average crop of 135 per cent for a six-year period during which the ewes were fed continuously on a high plane of nutrition.

Evidence is offered by McKenzie and Berliner<sup>117</sup> that fertile rams, fitted to show condition, continue to be fertile while in a high state of fleshiness. These workers also found that the increased adiposity, which is generally believed to cause an increased body tem-

perature and associated degenerative changes in the testes, did not increase either rectal or scrotal temperature in rams.

The experiments of Eckles *et al.*<sup>43</sup> showed that heavily fed Jerseys and Holstein-Friesians manifested their first heat 76 and 112 days, respectively, before heifers on a low plane of nutrition.

On the other hand, several investigations<sup>108</sup> have found fatty deposits in the ovaries with few follicles in a limited number of cows which were both fat and sterile. In another group of fat cows, it was found that ovaries, normal in other respects, were smaller than normal.<sup>139</sup>

An analysis of the data at hand would indicate that it is as logical to assume that sterility is the cause of high condition as it is to assume the reverse. Either view appears presumptuous on the basis that no data derived from well-controlled experiments support these beliefs.

It seems possible that sterility and high condition may be concurrent as a result of the same cause. However, an excellent example of sterility not caused by, but occurring concomitantly with, fatness has been reported in human beings and experimental animals.<sup>97, 102</sup> The condition is attributed to a lesion at the base of the brain with involvement of the hypophysis. Of interest in this connection is the increased fat deposition which follows castration in many species of animals.

The problem concerning overfeeding of animals as related to fertility is entirely unsettled. The Cornell Experiment Station will undertake an experiment designed to study the effects of different prepubertal levels of feeding upon reproduction in dairy cattle. This study should give definite answers to the problem of fertility as affected by prepubertal diet.

#### PROTEIN

Under the usual conditions of cattle management, the possibility of a deficiency in either quality or quantity of protein seems remote. A different situation, however, exists in animals of other species.

Larsen and coworkers<sup>36</sup> reported that a high intake of digestible protein increases the fertilizing capacity of bulls. Contrary to these findings is the high incidence of sterility reported by Webster<sup>170</sup> to be associated with morphologically abnormal spermatozoa in bulls grazing pastures in New Zealand where the crude protein content of grass is as high as 35 per cent of the dry matter. Branton and associates<sup>37, 38</sup> demonstrated that concentrate mixtures containing 12, 16, and 20, per cent total protein did not significantly affect

the fertility of bulls. However, bulls receiving the 20 per cent protein concentrate produced a greater concentration of spermatozoa, lower ejaculate volume and motility, and less spermatozoa per ejaculation than did bulls receiving the other concentrate feeds.

Studies of sterility, produced in rats by feeding diets containing in excess of 65 per cent protein and 15 to 18 per cent protein derived largely from the biologically poor protein of maize or maize and gelatin,<sup>97, 98</sup> have stimulated some use of animal protein sources in concentrate mixtures for bulls. These investigations indicated that some essential amino acid deficiencies exist in maize and gelatin which caused a reduction in motility and concentration of spermatozoa and an increase in the quantity of morphologically abnormal spermatozoa. Russian investigators<sup>100, 101</sup> have indicated that animal protein is superior to vegetable protein for semen production by the bull. A ration consisting of oats and concentrates was said to be more advantageous than oats alone from the standpoint of the semen volume and spermatozoa concentration produced, and further improvement was reported when the ration included bone meal, skimmilk,<sup>100</sup> and blood meal.<sup>101</sup> These workers indicated that rations containing high levels of protein, but less total nutrients, were more conducive to semen production than were rations containing oats.<sup>101</sup> Certain bulls showed improved spermatogenesis when normal rations of legume or mixed hay and concentrates were supplemented with high-protein feeds consisting of kelp and fish-meal, iodinated-casein, or skimmilk powder.<sup>94</sup>

When wheat supplies the only source of protein (even at a level of 18%) in the diet of rats, estrus and ovulation fail to occur.<sup>96, 102</sup> Lysine added to this diet remedied the reproductive abnormalities. Similar disturbances were found when casein, a protein of higher quality than gliadin, was fed at levels of 3.5 to 5.0 per cent.<sup>96, 102</sup> Rats on the low casein diet did not experience estrus or ovulate even though they were in good health, maintained weight, and grew, although subnormally. The deficient factor in this diet was not lysine<sup>103</sup> or cystine.<sup>102</sup> Although it has not been proved that low protein intakes suppress pituitary activity, Courrier and Raynaud<sup>96</sup> and Cole, Guilbert, and Goss<sup>97</sup> have produced ovulation in protein-deficient rats by administering pituitary substances. Courrier and Raynaud<sup>96</sup> found that pituitary glands of protein-deficient rats were smaller and produced less ovarian response than normal glands. Several types of reproductive failure found in rats on varying degrees of protein deficiency by Guilbert and Goss<sup>97</sup> were: (1) cessation of estrous cycles, (2) failure to mate, (3) infertile matings, and (4) fertile matings followed by death of embryos. The findings of Keller,<sup>93</sup> that tryptophane is in-

involved in the reproduction of the rat, appear to have been superseded by the more recent finding that all rats receiving a tryptophane-deficient diet were fertile.<sup>14</sup>

Estrus and ovulation in rabbits were not affected by diets containing 2 per cent protein or protein-free diets fed over long periods, even though the animals lost as much as 25 per cent of their original weight.<sup>97</sup> Hart and Miller<sup>98</sup> pointed out that a limited intake of protein has little effect upon fertility in sheep. Apparently, protein is synthesized by these species in quantities sufficient to support reproductive functions.

Davidson<sup>91</sup> demonstrated that a protein deficiency, sufficiently acute to cause severe retardation of growth in sows, did not increase the incidence of fetal atrophy.

### CARBOHYDRATE

Carbohydrates *per se* do not appear to influence reproduction in most species.

No effect upon the regularity or frequency of estrous cycles was observed in rats receiving a diet free from carbohydrates.<sup>90</sup> The substitution of 20 per cent of sucrose for starch in the diet of rats resulted in precocious sexual maturity later followed by sterility.<sup>72</sup> Although reproduction in these animals was normal when starch or lactose was the source of carbohydrate, sucrose appeared to be responsible for an extreme luteinization of unruptured follicles followed by persistent corpora lutea. An explanation for the effects of sucrose is nebulous.

### FAT

It is improbable that a deficiency of fat (ether extractives) will be encountered in ruminants. The bases for this conclusion are: (1) natural feedstuffs supply an abundance, (2) ruminant animals appear to be wasteful in their use of this nutrient, and (3) other nutrients are converted into fat.

Deficiencies of essential fatty acids which influence reproduction in the rat, as described by Burr and Burr<sup>92</sup> and Maeder,<sup>104</sup> are quite unlikely to occur in ruminants since forages are an excellent source of these substances.

In rats, a deficiency of essential fatty acids results in the cessation of estrus simultaneously with the occurrence of the clinical deficiency symptoms.<sup>91</sup> Ovulation appears to occur late in the course of deficiency, while the ability to reproduce is impaired early.<sup>105</sup> When fat is supplied to deficient rats, the estrous cycle is restored to normal before an appreciable effect on general health is observed.<sup>91</sup> Atrophic changes in the decidua, resorption of fetuses, and prolonged gestations similar to the conditions ascribed by Mason<sup>111</sup> to a deficiency of vitamin A have been reported.<sup>92</sup> Death of the fetus appears to be secondary

to placental injury. Large, white-appearing ovaries showing vacuolization and granulation are found.<sup>60</sup> Occasionally, the genitalia are irreparably damaged. Since the symptoms of reproductive failure resemble those found in vitamin A deficiency, further study of possible relationships of the essential fatty acids to carotene and vitamin A utilization seems promising.

#### VITAMIN A

A lack of vitamin A appears to affect reproduction adversely in most species. The symptoms of vitamin A deficiency, in so far as reproduction is concerned, are quite similar in the rat, sheep, and cow. The major reproductive disturbances in the female of these species occur during the latter portion of gestation; the pregnancy usually terminates in abortion or in the birth of weak or dead offspring. It is indeed amazing that these animals experience normal estrous cycles, ovulate, and conceive when the epithelial and other tissue changes are perpend. The mature females of these species manifest the avitaminosis A pregnancy abnormalities on diets providing vitamin A in sufficient quantities to maintain fairly normal health.<sup>67</sup> This consideration may indicate that the vitamin A needs of mature animals for reproduction are greater than the minimum maintenance requirements. Likewise, since the male appears to be more resistant to vitamin A deficiency than the female, the female may have a somewhat higher requirement for this factor than the male.

The results of dietary lack of this factor in animals are: (1) keratinization of vaginal epithelium,<sup>68, 69, 70, 71</sup> (2) degeneration of the placenta during the latter part of gestation with resultant hemorrhage and abortion,<sup>72</sup> and (3) when pregnancies are not interrupted and continue to full term, labor is long and difficult and often terminates in stillbirths or in the birth of weak and blind young.<sup>73, 74</sup> Considerable data indicate that the estrous cycle, ovulation, and early fetal development are not noticeably affected.<sup>69, 70, 71, 75</sup> Levels of vitamin A, sufficiently low to produce cornified vaginal smears, permit the establishment of pregnancy in rats and other animals.<sup>68, 69, 70, 71</sup> Hart and Miller<sup>76</sup> reported that sheep depleted of vitamin A to the point of partial night blindness exhibited estrus, ovulated, and became pregnant. In an earlier report from this station, Hart and Gullbert<sup>77</sup> mentioned that a high percentage of dead lambs were born of a flock of ewes consuming dry range feed and bean straw. No vitamin A was detected in the liver of 1 lamb. It is possible that the ewes were receiving inadequate quantities of protein,

energy, and certain minerals as well as carotene. When the ewes were given alfalfa hay, the loss of lambs was stopped. These investigators<sup>78</sup> pointed out the necessity of providing an adequate amount of vitamin A during the gestation period to ensure the normal birth of lambs.

Hughes *et al.*<sup>81, 82</sup> described the symptoms of vitamin A deficiency in the sow. The nervous manifestations appeared to be the predominant symptoms. Gilts with avitaminosis A experienced irregular estrous cycles. Heat occurred more frequently and was of longer duration, and conception was inhibited to a greater extent in deficient gilts than in gilts receiving adequate vitamin A. Gilts bred prior to the manifestation of nervous symptoms either aborted or farrowed dead pigs.

Although a deficiency of vitamin A in dairy cattle is not likely to occur under the usual conditions of feeding, it has been reported by Hart and Gullbert<sup>79</sup> in cattle grazing dry, bleached range feed and unharvested grain fields. These workers<sup>74</sup> reported the birth of dead or weak calves which die soon after birth, abortions during the second half of pregnancy, the retention of placenta, and the failure to experience estrus until five or six months after calving, prior to which time green feed had become available.

The California investigation showed that other symptoms which are indicative of vitamin A deficiency, *i.e.*, lacrimation, ophthalmia, occasionally complete blindness, anorexia, diarrhea, etc., were present in the affected animals; adult cows showed less marked deficiency symptoms than young animals. It is possible, under natural range conditions where dry range feed is allowed cattle for as long as nine months, that protein, phosphorus, and energy are deficient as well as vitamin A. Under these conditions, the manifestations are largely limited to reproductive disturbances.<sup>74</sup> The feeding of liberal quantities of grain and protein supplements stimulated growth and milk production, but did not ameliorate the symptoms attributed to vitamin A deficiency. When green feed became available, the symptoms disappeared except for a few cases of blindness which were permanent. Precaution should be taken in the diagnosis of vitamin A deficiency disease in cows because the symptoms of reproductive failure closely resemble those of brucellosis.

Retrospection of the early reports by Hart *et al.*<sup>68, 69, 70</sup> of reproductive disturbances in cattle fed well-balanced rations containing the wheat, corn, and oat plants, respectively, and mixtures of these plants would suggest that a deficiency of vitamin A was encountered in these experiments rather than a condition of plant toxicity. These investigators<sup>71</sup> later attributed the reproductive disturbances obtained on diets of these plants to a lack of vitamin A and calcium. Others<sup>72, 86</sup> have reported repro-



ductive disturbances attributable to vitamin A deficiency. The blood plasma level of carotene must be at least 118 and 83  $\mu\text{g.}/100\text{ cc.}$  to support gestation in first-calf range Hereford heifers and aged cows, respectively, according to Payne and Kingman.<sup>120</sup> Meigs and Converse<sup>121</sup> found a uniform incidence of premature dead, weak, and blind calves born of infectious abortion-free cows which had received rations of grain and U.S. No. 3 timothy hay (cut in seed stage) for long periods. When a higher grade of timothy hay was fed, the proportion of normal calves was larger, and, when U.S. No. 1 alfalfa hay was fed, reproductive performance was quite satisfactory. The best grades of timothy hay generally have no more than about 10 per cent as much vitamin A activity as the best alfalfa. Moore<sup>122</sup> suggested that an intake of 40 to 50  $\mu\text{g.}$  of carotene per pound of body weight is needed for either reproduction or milk production and that this is met by most U.S. No. 2 grades of hays. Axelsson<sup>8</sup> found that cows receiving a daily intake of 27 to 47 mg. of carotene during a three-month period before service required 2.0 matings per pregnancy. When the daily roughage contained 48 to 73 mg. of carotene, the service requirement dropped to 1.4. A further improvement to 1.2 services per pregnancy was found when more than 73 mg. of carotene were fed. The cows used in this study were of medium size. These findings are different from those of other workers in that conception appears to be suppressed by the lower carotene intakes.

Although the importance of vitamin A in testicular health and/or semen production has been extensively demonstrated,<sup>46, 47, 58, 79, 82-87, 103</sup> a deficiency of this vitamin appears unlikely when bulls receive the usual rations. Jones *et al.* have shown that carotene or vitamin A intakes which are adequate for normal growth of bulls are also satisfactory for normal reproduction<sup>26</sup> and that daily carotene intakes in the range of 15 to 35  $\mu\text{g.}$  per kilogram of body weight are sufficient to maintain fertility in Jersey bulls.<sup>26</sup> Axelsson<sup>8</sup> suggested that the daily roughage fed to bulls should contain 80 to 100 mg. of carotene to ensure an adequacy for reproduction. The study of Hodgson and associates<sup>79</sup> is of particular interest with regard to the effects of low carotene diets on bulls. At the expected breeding age, bulls given an opportunity to mount a cow were too weak or showed no desire. Of 12 bulls exhibiting vitamin A deficiency symptoms, semen of 7 was fertile although the concentration of spermatozoa was low, abnormal spermatozoa numbers and pH were high, and the semen was of poor storage quality. When gross vitamin A deficiency symptoms appeared before the expected breeding age, the bulls failed to breed. When the symptoms appeared near the age of expected breeding, a failure to breed was manifested shortly thereafter; whereas, the

capacity to breed was maintained when the deficiency became apparent subsequent to the commencement of breeding. A striking observation reported by Hodgson and others<sup>79</sup> is the occurrence of cystic pituitary glands in which approximately 75 per cent of the anterior lobe was damaged in all avitaminosis A-affected bulls autopsied. A similar observation recorded by Erb *et al.*<sup>47</sup> led these workers to point out that prepubertal damage may be permanent, especially when cystic pituitary glands develop and total blindness occurs. Others have reported the development of pituitary cysts in vitamin A deficient cattle.<sup>103, 123</sup> In the Beltsville experiments,<sup>79</sup> supplementation of the diet of 4 avitaminosis A affected bulls with 8 to 11  $\mu\text{g.}$  per pound of feed initiated breeding, but the quality of semen was not improved appreciably. The testicular tissue of these animals was in better condition at autopsy than the bulls not receiving carotene-supplemented rations, which would indicate that some degree of repair was being effected by carotene. The germinal epithelium of 1 bull, whose feed consumption was restricted, failed to regenerate regardless of carotene supplementation. Additional evidence of the repair of damaged testicular tissue and the restoration of spermatogenesis following the supplementation of the diet of vitamin A deficient bulls with carotene is recorded by Hart<sup>77</sup> and Erb *et al.*<sup>47</sup> Severe impairment of the bull's reproductive function appeared subsequent to the development of the gross symptoms of vitamin A deficiency. A recent report<sup>47</sup> from the Purdue station indicated that a lack of vitamin A delays sexual maturity in addition to suppressing sex interest and spermatogenesis.

The manifestations of avitaminosis A in the male rat are not unlike those in the bull. Levels of vitamin A sufficient to manifest deficiency signs in the female rat are without detrimental effect upon the testes of the male. More severe deficiencies, in which eye lesions begin to appear, effect some degree of damage in the testes;<sup>124</sup> however, even at this point, the lesions are not sufficiently severe to stop the formation of motile spermatozoa.<sup>27</sup> When the deficiency is sufficiently great or prolonged to cause weight losses, more pronounced testicular lesions appear. According to Friedman and Turner,<sup>27</sup> the damaged testicular tissue is repaired by quantities of vitamin A too small to permit a gain in body weight. The repair of the testes of the male rat in response to vitamin A therapy appears to be more marked than that in the bull.

#### VITAMIN E

Reproductive disturbances in several species have been attributed to an insufficient amount of vitamin E in the diet. The most common attempts at vitamin E



therapy in livestock have involved animals which experience normal heat periods and apparently ovulate normally but which fail to conceive following service. It is not generally used to treat livestock which have aborted.

Vitamin E deficiency, like that of vitamin A, does not affect the estrous cycle or ovarian function in the female rat.<sup>51</sup> Generally, pregnancy is interrupted after mid-term by resorption of the fetus due to the effects of the disease upon the mesodermal tissues and the vascular system.<sup>52, 57</sup> The manifestations of vitamin E deficiency are further distinguished from those of vitamin A, in that the former does not affect the epithelial structures and does not result in abortions.<sup>52, 111</sup> In the male rat, the ultimate result of vitamin E deficiency is permanent sterility.<sup>57</sup> The testicular epithelium becomes irreparably damaged and does not respond to vitamin E therapy.<sup>44, 52</sup>

Although numerous cases of benefits derived from vitamin E supplementation of livestock rations have been cited, it is doubtful that a need for vitamin E, greater than that quantity provided by natural feedstuffs, exists in herbivorous animals. The only class of animal, other than the rat, for whose reproduction vitamin E appears to be essential is poultry.<sup>1, 10, 32</sup> and, even in this species, the rations fed generally provide sufficient quantities.

In many of the reports of improved fertility in cows, the results were complicated by other treatments being administered simultaneously.<sup>11, 55, 120, 126, 129</sup> Recovery from infertility was in no case clearly attributable to vitamin E therapy, and the results of this treatment were far from startling. Perhaps a large proportion of the improvement reported could be as justifiably attributed to spontaneous recovery as to the administration of vitamin E. A number of other reported experiments, which indicated that beneficial effects were derived from wheat germ oil, are outstanding in their lack of suitable control measures.<sup>135</sup>

In a series of well-controlled experiments conducted in Hawaii by Henke,<sup>78</sup> 38 cows with irregular breeding behavior were fed sprouted oats as a source of vitamin E. Of these animals, 82 per cent produced calves; whereas, in the control group of 37 cows exhibiting similar breeding irregularities, 76 per cent produced calves. Henke<sup>78</sup> studied another group of cows and heifers which had been bred once but had not come into heat again. Of 27 cows and heifers in this classification fed sprouted oats, 74 per cent produced calves; of 25 control animals, 72 per cent produced calves. The average number of services required for conception in the oat-fed and control groups were 3.4 and 4.2, respectively. All cows, regardless of group, received an abundance of green feed daily. No detailed information

relative to the composition of the diets used in these experiments was given.

A recent publication by Harris *et al.*<sup>79</sup> inferred that vitamin E supplementation reduces the number of services required for conception, the incidence of stillbirths, abortions, and retained placentas. However, a number of data suggest that cows can reproduce normally on vitamin E free diets.<sup>84</sup> A similar situation was found in rabbits,<sup>78</sup> goats,<sup>120, 122</sup> and sheep.<sup>121</sup> It was demonstrated that these species are capable of reproducing normally for two or more generations on diets sufficiently low in vitamin E to produce complete sterility in rats.<sup>114, 123</sup>

Henke<sup>78</sup> concluded from his experiments that the feeding of sprouted oats is not particularly helpful in correcting sterility or in reducing the time required for conception in sows. Of 15 sows, each fed 1 lb. of sprouted oats (dry basis) daily, 87 per cent produced litters; whereas, 12 of the 16 control sows produced litters. All sows, regardless of group, received at least 1 lb. of green alfalfa or other green feed daily.

According to the controlled study made by Salisbury,<sup>134</sup> the addition of vitamin E to the ration of dairy bulls (in the amount of 1 oz. of wheat germ oil daily) did not influence fertility or the character of the semen; however, Timin and Pereturina<sup>136</sup> reported that the feeding of 500 to 1,200 Gm. of wheat germ per day to beef bulls resulted in an increased viability and concentration of spermatozoa in the semen within twenty-five to thirty days after feeding was begun. Although an explanation for the different results obtained in these experiments is not apparent, it may be that dairy bulls react to the treatment differently than beef bulls, or that the difference may be due to the form or quantity of wheat germ fed. In a limited number of bulls receiving vitamin E free diets, Gullickson *et al.*<sup>84</sup> found all to be fertile upon service.

The use of vitamin E appears to have stemmed from the known response of the rat to vitamin E deficient diets since, in this animal, there is no interference with estrus or ovulation, and abortion does not occur. No physiologic basis is evident for a mode of action of a single injection of wheat germ oil at the time of service or of continuous feeding of this substance prior to service of, for example, the cow, which would ensure a reasonable rate of conception. According to Friedman and Turner,<sup>57</sup> the argument has been presented that the vitamin may, in some way, stimulate ovulation or prolong the life of the ovum. A number of investigators,<sup>80, 124, 133</sup> however, have discounted the alleged estrogenic activity of vitamin E.

(To be continued)

# EDITORIAL

## How Many Veterinarians Should We Have?

The JOURNAL'S claim, from time to time, that the United States should have at least three times as many veterinarians as the records show is based upon experience gained from years of rambling among practitioners, research workers, food hygienists, livestock sanitarians, army officers, nutritionists, herdsman, horse trainers, pet animal breeders and owners, all the time seeking the right answer to this basic question.

In view of the effect on humanity, the question of how many veterinarians this country should have is not to be lightly brushed aside. It is an old but unsettled question. The early practitioners of the U. S. A. looked upon every graduating class of the nineteenth century and beyond as a group of business competitors; and after applied veterinary medicine had outgrown such unbecoming ethics, overcrowding became the fear complex,—without first making a critical analysis of the veterinary problem in the modern world.

In the 102nd year of American independence, Prof. James Law, of Cornell University (*Am. Vet. Rev.*, July, 1878: 158-175), made the startling statement, after a ten-year study, that *the United States ought to have 39,019 college-trained veterinarians to cope with its animal disease problems.* That was seventy-two years ago! The figure was based on the large number, and the essentiality, of our domestic animals, plus the deluge of emigrants arriving to exploit our acres of virgin soil. A population of 50,000,000 possessed 100,700,000 head of livestock, and there were only "about 200" competent animal doctors in the whole country, most of them practicing among the horses of the big cities. That was 1 veterinarian per 500,000 animals, compared with Great Britain's ratio of 1:4,800.

At the time (1878), in the United States, there were 11,000,000 horses and mules, 27,000,000 beef and dairy cattle, 28,000,000 hogs, 40,000,000 sheep (and of course the poultry flocks not mentioned in the article cited above), all more or less plagued with the usual, wealth-sapping diseases (glanders, strangles, tuberculosis, etc.). Professor Law envisioned the dire need of a well-grounded veterinary service, and after ten years of close observa-

tion (1868-1878), he reported that building up a profession of 39,000 was the minimum requirement for the United States. At the time, there was but one veterinary college in the U.S.A., the American Veterinary College (established in 1875).

Professor Law's recommendation was electrifying. It started education and service in our field with a bang. Besides the founding of the U. S. Bureau of Animal Industry (1884), public veterinary education was established at Iowa State College (1879), Harvard University (1882), University of Pennsylvania (1884), Ohio State University (1885), all, except one (Harvard), of which are still foundation stones of our animal industry. In the following decade came New York State Veterinary College (1894), University of California (1895), and Washington State College (1899), together with quasipublic colleges and proprietary schools which did not survive. That, in a few words, is a lot of veterinary history to take into account in planning the future manpower of the veterinary profession on the present basis of 145,000,000 human population and 200,000,000 farm animals. A vast poultry industry, 13,000,000 dogs, and the ramifications of veterinary medicine in biological research, public health, and food hygiene are added major considerations.

Two schools of thought were created in 1878 as a result of Professor Law's notable announcement, and both continue to flourish. The one school argues for a small profession (fearful of overcrowding, with its attendant evils), and the other supports the idea that many more veterinarians are needed to maintain a reasonably sufficient veterinary population for the present 145,000,000 persons in the United States.

The matter is one to be settled not from chance opinion based on imagination but by a thorough study by economists familiar with the fields served by modern veterinary science. The question of "How Many Veterinarians Should We Have?" is delicate, fundamental, far-flung, and unsettled. It warrants serious consideration. How many veterinarians can be effectively employed in 1950? In 1955? In 1960? Before answering, ponder the figure recommended in 1878.

# CURRENT LITERATURE

## ABSTRACTS

### Motility of Bovine Sperm

Sperm motility is normally initiated in the ampullae. It is the outcome of admixture with the accessory secretions rich in electrolytes and of a series of functions which harmoniously synchronize at the time of ejaculation. Motility may be regained after it stops, but such motility is usually of short duration.

Although motility has been criticized as an inadequate index of the fertilizing capacity of sperm, it remains the best single criterion we have. A simple system of grading semen samples is based on the amount of disturbance in the microscopic field at a magnification of 250 and on a stage heated to 100 F.

**Good.**—Whirlpool formations appear and disperse rapidly in waves and eddies (80% of sperm alive).

**Medium.**—Disturbance in the microscopic field is marked, but waves and eddies are not pronounced (65% of sperm alive).

**Fair.**—Disturbance in the microscopic field is not pronounced (50% of sperm alive).

**Poor.**—Disturbance in the microscopic field is poor (35% of sperm alive).

**Dead.**—No movement in microscopic field.—[C. K. Rao and G. H. Hart: *Motility of Bovine Spermatozoa*. *Am. J. Vet. Res.*, 9, (1948): 286-290.]

### Penicillin in Mastitis

There may be threshold levels for penicillin in the bovine udder, and these may be entirely independent of dosage. If so, the frequency of administration of the drug is much more important than the number of units injected in so far as maintaining substantial levels in the udder is concerned.

Contrary to some earlier observations, it appears that more penicillin leaves the udder in a low producing cow than in a high producing one. The result is that each has about the same level of penicillin twelve and twenty-four hours after the injection. Hence, the previous recommendation, that larger doses should be administered to cows producing heavily, does not seem to be justified.

Penicillin was absorbed from the udder and eliminated in the urine.

There is little difference in the penicillin sensitivity of streptococci and staphylococci isolated from bovine mastitis as determined by growth inhibition tests, but the bactericidal

activity does not parallel the bacteriostatic sensitivity. Streptococci are killed by about 100 times the amount needed to inhibit growth, while staphylococci require 500 times as much to kill as to inhibit.

Penicillin concentrations in the milk remained the same at twelve- and 24-hour intervals after injection of amounts varying from 25,000 to 200,000 units.—[R. A. Packer: *Penicillin Therapy in Chronic Bovine Mastitis. II. Penicillin Levels in the Udder During Treatment, and III. Treatment of Mastitis*. *Am. J. Vet. Res.*, 9, (1948): 258-263 and 264-269.]

### Equine Influenza

A vaccine prepared from infective spleen suspensions produced a mild febrile response followed by immunity to further inoculations. This vaccine has promise in immunizing against natural infection.

The virus of equine influenza could not be adapted to ordinary laboratory animals (ferrets, mice, rabbits, cotton rats, calves, rats, swine, cats, guinea pigs, and hamsters), nor could it be cultivated in chicken embryos or tissue cultures.

Virus could be demonstrated in blood, serum, nasal washings, and nasal or turbinate mucosae, but the preferred source was the spleen collected in the earliest part of the febrile stage of the disease.—[T. C. Jones, C. A. Gleiser, F. D. Maurer, M. W. Hale, and T. O. Roby: *Transmission and Immunization Studies on Equine Influenza*. *Am. J. Vet. Res.*, 9, (July, 1948): 243-253.]

### Fowl Plague Immunization

Major considerations were given to defining optimal circumstances for the preparation, preservation, and use of vaccines. Formalin and ultraviolet light of 1,600 to 1,800 Å. wave length were highly useful for the destruction of virus infectivity in the preparation of inactivated virus vaccines. Maximal immunity resulted from vaccination with nonadjuvant vaccines followed after several months by exposure to D.E.I.\* virus. The immunity persisted for as long as eighteen to twenty-one weeks following vaccination with whole egg adjuvant vaccines and with living variant virus. This was the longest period studied.—

\*Dutch East Indies.

[H. E. Moses, C. A. Brandly, E. E. Jones, and E. L. Jungherr: Immunization of Chickens Against Fowl Plague. *Am. J. Vet. Res.*, 9, (Oct., 1948):399-420.]

### Newcastle Virus Isolation

Newcastle disease virus was isolated, uncontaminated, from 49 of 258 tissue specimens by using streptomycin in a concentration of 25 mg. per cubic centimeter of tissue extract.—[O. H. Thompson, Jr., and O. L. Osteen: A Technique for the Isolation of Newcastle Disease Virus, Using Streptomycin as a Bacterial Inhibitor. *Am. J. Vet. Res.*, 9, (July, 1949):303-305.]

### Sulfaquinoxaline in Coccidiosis

Chickens may be protected against *Eimeria tenella* infection under field conditions when 0.0125 per cent of sulfaquinoxaline is added to the mash within three days of the time of infection. Mortality was lower, and rate of gain higher in the medicated birds than in the unmedicated controls. Four times as much sulfamethazine (0.05%) was required to accomplish comparable results.—[L. C. Grumbles and J. P. Delaplane: Relative Activity of Sulfamethazine and Sulfaquinoxaline Against *Eimeria Tenella* Infection in Young Chickens. *Am. J. Vet. Res.*, 9, (July, 1948):306-309.]

### Treatment of Trichomoniasis

Of 19 infections (in 17 trichomonad-infected bulls) treated with a total of 31 courses of iodides, 10 infections were terminated. Potassium iodide was administered orally to some bulls, sodium iodide was injected intravenously into others, and a third group was treated by topical application of a trichomonadocidal ointment (a proprietary preparation of a German company called bovafavin salbe or G.P.C.). Of 8 bulls treated with the latter product, 7 appeared to make a complete recovery.—[D. E. Bartlett: Further Observations on Experimental Treatments of *Trichomonas Foetus* Infection in Bulls. *Am. J. Vet. Res.*, 9, (Oct., 1948):351-359.]

### Lice on Cattle, Sheep, and Goats

In cattle, two treatments with DDT—oil-water emulsions containing 0.25 per cent DDT in both spray and dip form, with an interval of three weeks between treatments, eradicated infestations of *Hematopinus eurysternus*. As little as 0.1 per cent DDT successfully eradicated infestations of *Linognathus stenopsis* and *Trichodectes climax* from goats with a single application. One dipping in 0.5 per cent DDT eradicated *Linognathus pedalis* from sheep.—[H. E. Kemper, N. G. Cobbett, I. H. Roberts, and H. O. Peterson: DDT Emulsions

for the Destruction of Lice on Cattle, Sheep, and Goats. *Am. J. Vet. Res.*, 9, (Oct., 1948):373-378.]

### Sodium Fluoride Treatment of Roundworms in Pigs

When fed at the rate of 1 per cent sodium fluoride in dry, ground feed, the drug was 93 per cent effective in expelling ascarids and 62 per cent effective against stomach worms. Vomition and soft feces, both of temporary duration, occurred in about 10 per cent of the cases.—[A. O. Foster, F. D. Enzie, R. T. Habermann, and R. W. Allen: The Status of the Sodium Fluoride Treatment for Removal of Large Roundworms from Swine. *Am. J. Vet. Res.*, 9, (Oct., 1948):379-385.]

### Fowl Plague Virus

A Dutch East Indies strain of fowl plague virus possessed the following features: tolerance to high concentrations of penicillin; tolerance to appreciable concentrations of phenol and merthiolate; sensitivity to heat and concentrations of certain disinfectants within ranges of their practical usage; marked variations in tolerance of the infectivity; and a narrower range of stability in an acidic environment.—[H. E. Moses, C. A. Brandly, E. E. Jones, and E. L. Jungherr: The Isolation and Identification of Fowl Plague Virus. *Am. J. Vet. Res.*, 9, (July, 1948):314-328.]

### Immunity to Avian Coccidiosis

Four-week-old chicks were inoculated with large doses of *Eimeria tenella* oöcysts, and then given sodium sulfamerazine, sodium sulfamethazine, sulfaquinoxaline, and sodium borate for seven days. Death losses occurred in the groups given sulfamethazine and sodium borate, clinical symptoms (but no deaths) in the sodium sulfamerazine group, while the sulfaquinoxaline group not only showed no visible symptoms but also made the greatest gains.—[E. R. Kouts: Immunity Studies in Avian Cecal Coccidiosis I. The Value of Drugs to Establish Immunity in Young Chickens. *Am. J. Vet. Res.*, 9, (Oct., 1948):388-395.]

### Sodium Fluoroacetate Poisoning in Sheep

Sodium fluoroacetate (compound 1080) may cause accidental poisoning and economic loss by virtue of the extremely low minimal lethal dose. Sheep and cattle should be excluded from areas where it is exposed for control of noxious mammals. The m.l.d. for sheep was 0.25 to 0.50 mg. per kilogram of body weight. Symptoms of poisoning were motor irritation, excitation, rapid pulse becoming weak, general weakness, convulsions, and death. Every animal showing symptoms died, heart action ceasing before respiration.—[Rue Jensen, J. W.



*Tobiska, and J. C. Ward: Sodium Fluoroacetate (Compound 1080) Poisoning in Sheep. Am. J. Vet. Res., 9, (Oct., 1948):370-372.]*

### Equine Sarcoid

Tumors appeared on the lower portions of the legs, eyelids, lips, and other parts of the skin of the head, sheath of the penis, and inner aspect of the thigh. Of 2 cases of this condition here reported, successful autotransplantation of the tumor to scarified skin was obtained in 1 case.—[Carl Olson, Jr.: *Equine Sarcoid, a Cutaneous Neoplasm. Am. J. Vet. Res., 9, (Oct., 1948):333-341.*]

### Immunization of Yaks Against Rinderpest

Our previous work, using goat virus alone to immunize yaks against rinderpest, plainly indicates that this species of animal is too susceptible to the virus as there was about 10 per cent mortality following immunization. Therefore, the Mukteswar strain of goat virus was used in combination with either hyperimmune serum prepared from yellow cattle or reactor serum prepared from yaks and Plen cattle. There were hardly any observable symptoms in 815 yaks after inoculation, not even in the highly emaciated and under-nourished cases.

The reactor serum was definitely more potent than the hyperimmune serum. In antirinderpest serum production, the author recommends the use of yaks, Plen cattle, and buffaloes for serum animals and reactor serum in place of hyperimmune serum.—[F. J. Kwong: *Immunization of Yaks Against Rinderpest by Means of Serum Simultaneous Method. Chinese J. of Anim. Husbandry and Vet. Sci., 6, (Sept., 1947):45-50.*—C.-S. L.]

### Hog-Cholera Virus Propagation in Rabbits

Hog cholera is a serious veterinary problem in China. A cheaper vaccine was sought by lapinizing this virus. Hog-cholera virus has been passed through rabbits of four successive generations but failed to infect pigs with rabbit blood of the fourth generation. Incubation period of hog-cholera virus in rabbits varied from twenty-four to 116 hours.—[L. R. Ching and C. T. Cheng: *A Preliminary Report on Hog-Cholera Virus Propagation in Rabbits. J. Agric. A. of China, 186, (March, 1948):39-43.*—C.-S.L.]

### Contagious Canine Hepatitis Test

Only serums from dogs infected with this disease will give a positive complement fixation test. The antigen is prepared from organs of dogs known to be infected. No reaction is obtained with an antigen prepared from tissues of normal dogs. Antibodies appear about seven days after infection and persist for as long as eight months.

In artificial infections, an antigenic substance, probably the virus, can be demonstrated four to seven days after inoculation. The complement fixing antibodies appear when the antigenic substance can no longer be detected in the blood.

Of 229 dogs, 103 (45%) gave positive complement fixation tests, 26 (11%) were doubtful, and the remainder were negative. Complement fixing antibodies were demonstrable in foxes infected with the virus of contagious canine hepatitis. A type of contagious hepatitis, designated as type "F" (fells) was demonstrated in cats. The canine type is designated as type "C."

Antibodies against both types were found in the same dog.—[E. Lehnert: *The Value of the Complement Fixation Test in Contagious Canine Hepatitis. Skand. Vet.-Tidskr., 38, (Feb., 1948):94-107.*—A.G.K.]

### Reducing Esophageal Impaction in Horses

A narrow gauge rubber tube is placed in the lumen of a nasal stomach tube with a large bore. With the head held low, a stream of water is forced through the small tube, which washes the impacted beet pulp back out through the large tube. The risk of inspiration is diminished by the procedure.—[G. Bjork: *The Use of a Double Tube in the Treatment of Esophageal Impaction Due to Sugar Beet Pulp in Horses. Skand. Vet.-Tidskr., 38, (Feb., 1948):66-70.*—A.G.K.]

### Antu Poisoning in Dogs

Antu has been used widely in Sweden. This agent has a greater toxicity for dogs than is usually appreciated. Eight of 9 cases seen in the clinic of the Veterinary College in the last four months of 1947 were fatal. The principal symptom of dyspnea is due to the severe pulmonary edema which is the most characteristic pathologic change. Spontaneous vomiting was seen in only 2 cases, which suggests that vomiting may not be a protective mechanism in antu poisoning as had been stated by others. The respiratory distress is marked and a differential diagnosis must rule out acute pneumonia, diaphragmatic rupture, and acute cardiac embarrassment.

The electrocardiogram is thought to be characteristic. There is an elevation of the S-T segment in the limb leads and a disappearance of the R with the appearance of an isolated S in the chest lead. The postmortem picture is that of some circulatory disturbance. There is pronounced pulmonary edema and hydrothorax with edema of the mediastinum. Edema and hemorrhage were found in the gastrointestinal mucosa, brain, meninges, and in the parenchymatous organs. The myocardium showed no changes which would account for the pulmonary edema on a basis of cardiac



failure. It is believed that antu acts directly on the endothelium of the pulmonary vessels.—[S. Dyrendahl, H. J. Hansen, and N. Lannek: *Antu Poisoning in Dogs. Skand. Vet.-Tidskr.*, 68, (April, 1948): 193-212.] A.G.K.

### Clinical Differentiation of Psoroptic and Sarcoptic Mange of Horses

From observations on 167 cases of psoroptic mange and 43 cases of sarcoptic mange in horses, the author compiled a differential diagnostic table. The difference in topographical preference of the two species is illustrated. Psoroptic mange began on the withers, root of the tail, and the inguinal region and spread to the whole trunk, but was not observed below the carpus or hock. Sarcoptic mange began on the head, cranial part of the neck, and the scapular region and spread to the rest of the body, including the lower limbs.

The sarcoptic lesions were short-lived vesicles which quickly ruptured or dried, forming crusts (*Eczema pityriasicum sarcotiformes*). Psoroptic lesions were more persistent papules and pustules which ruptured with profuse exudation (*Eczema impetiginosum psorptiformes*). The sarcoptic mites and their burrows were invisible to the naked eye, but psoroptic mites could be seen as minute particles crawling among the crusts. Mechanical damage of sarcoptic mange was slight and superficial, that of psoroptic mange was severe and deep. The differential diagnosis of these diseases from other dermatoses is given.—[M. A. Palimpsestov, Kharkov Vet. Inst.: *Clinical Differential Diagnosis of Sarcoptiasis and Psoroptiasis of Horses. Veterinariya*, 25, (Nov., 1948): 6-12.] R.E.H.

### The per Rectum Intestinal Puncture in Horses

Because of frequent complications in the form of abscesses and infected hematoma, following intestinal puncture in horses through the abdominal wall, the latter method was replaced by the puncture per rectum. During the last three years, more than 40 intestinal punctures per rectum were performed at the Clinic of Medicine, in Zagreb, in cases of serious and medium meteorism, where pharmacotherapy or massage of the rectum were unsuccessful. Where necessary, even parts of the small intestines were punctured.

A needle 10 cm. long, with a 2.5-mm. lumen was used for this purpose, to which rubber tubing, 1.5 m. long, was attached. Not a single case showed any considerable reaction, although the puncture in some patients had to be repeated several times. The only consequence observed in a few animals was a more or less increased body temperature which decreased after two to three days without any intervention.

From the experience obtained, the author concludes that the needle described is the most simple, most practical, and least expensive instrument for the rectal puncture. The operation itself is less dangerous, easier to perform, simpler, and less painful than the intestinal puncture through the abdominal wall by means of a trocar.—[B. Miklausic: *The per Rectum Intestinal Puncture in Horses. Veterinarski Arhiv*, 12, (1942): 292.]—E. F.

### Diagnosis of Infectious Anemia

In examining horses for infectious anemia, Russian veterinarians have been causing passive hyperemia of the tongue by means of a rubber band or by pinching the tip between the fingers. This produces characteristic ephemeral petechiae in the affected animals.

The authors devised an apparatus to give better control of the conditions of the test. A cylindrical rubber vacuum chamber (a crutch tip with the bottom cut off) was closed at one end with a plastic watch crystal. A piece of rubber tubing was sealed into a hole on the wall of the vacuum chamber and connected to a 20-cc. syringe. The cup was placed on the mucosa of the ventral surface of the tip of the tongue or in the vagina, and evacuated by a full stroke of the syringe platon. The time of exposure has not yet been standardized. It varied from one half to two minutes, with some exposures of the tongue up to ten minutes. The results were read immediately upon removal of the cup, or after the hyperemia had disappeared.—[N. Z. Chernyak and A. D. Ledyayev, Leningrad Vet. Inst.: *Toward a Method of Determining the Resistance of the Blood Vessels in Equine Infectious Anemia. Veterinariya*, 25, (Nov., 1948): 12-13.] R.E.H.

### Piroplasmosis of Dogs

Three cases of canine piroplasmosis (babesiosis) were diagnosed in hunting dogs in Croatia. Blood films from the infected animals showed *Babesia canis*, and the carriers were infected with the dog tick, *Dermacentor reticulatus*.

The therapy with Trypanblue (1%) proved unsatisfactory. High fever, diarrhea, and enlargement of the spleen did not disappear following the treatment. Moreover, the parasites could be again recovered in the blood some time after the administration of the drug.

Neither did therapy with trypaflavine prove beneficial, since, after the treatment, the dogs still showed enlarged spleen, diarrhea, tachycardia, and increased respiration, though the parasites could not be diagnosed in the blood.

The best results were obtained with acaprin (0.5%) which was given in doses of 0.05 cc. per kilogram of body weight. After its administration, all the symptoms of the disease

finally disappeared and the animals recovered completely. Experiments were performed to transmit the disease artificially to 5 experimental dogs, 2 of which did not acquire the disease. Of the 3 dogs that became sick, 2 recovered spontaneously, while the third one, which showed only mild symptoms of piroplasmiasis, was cured with acaprin.

Due to the small number of dogs observed, the results of these experiments have only relative value.—[A. Sutlic: *Piroplasmiasis of Dogs*. *Veterinarski Arhiv*, 12, (1942):302.]—E. F.

## BOOKS AND REPORTS

### Streptomycin Literature

A bibliography of 40 titles on the actinomycetes in general and of 1,171 titles on streptomycin. There are also author and subject indexes. There are no abstracts of, or excerpts from, any of the papers indexed.

An excellent compilation of the references in this new and growing field of antibiotic activity is given. It should be valuable to the student who has access to a library containing the journals and books in which the indexed articles appear. But, to the veterinarian without such journals at hand, it serves only to indicate the wealth of information which has been published on this subject.—[*The Literature on Streptomycin*. By S. A. Waksman. Cloth. 112 pages. Rutgers University Press, New Brunswick, N. J. 1948. Price \$3.00.]

### Cornell Annual Report

This annual report follows the pattern of preceding reports from the New York State Veterinary College at Cornell University. In addition to a review of the activities of the College during the fiscal year 1946-1947, a list of the staff members for that year and reports of the services rendered by the several diagnostic laboratories of the College, there are papers prepared by staff members and presented before veterinary groups.—[*Annual Report of the New York State Veterinary College at Cornell University, 1946-1947*, No. 27A. Paper. 238 pages. The University of the State of New York, The State Education Department, Albany, N. Y.]

### Shock

Through its 17 chapters, this book traces the history, and classifies and lists the biological aspects, of shock. It describes the symptoms on which a diagnosis and a differential diagnosis can be based. Pathogenesis, the physical and biochemical changes, and the pathology of shock and hemorrhage are discussed. Separate chapters are devoted to medical and

obstetrical shock, to irreversible shock, and the effects of anoxia and hypoxia. Other chapters include: failure of circulation caused by toxemias and infections, by diseases of the liver and the adrenal glands, by nervous derangement, by thoracic disturbance, by burns and other types of thermal injuries, or by anesthesia. The concluding chapter of the text is devoted to the treatment of shock.

Although written for the human surgeon, obstetrician, and anesthetist, the book contains much information which applies also to animals and which can be used by the practitioner of veterinary medicine, especially in small animal practice.—[*Shock and Allied Forms of Failure of the Circulation*. By H. A. Davis, M. D., Los Angeles, Calif. Cloth. 595 pages. Illustrated. Grune and Stratton, 381 Fourth Ave., New York 16, N. Y. Price \$12.00.]

### Index of Treatment

This is a companion book to "Index of Diagnosis," by the same author, and is limited, also, to treatment of small animals—primarily dogs.

Part I (pp. 3-156) discusses the various types of therapy (actino-, radiant heat, electrochemo-, hormone, vaccine and serum, nonspecific vaccine, and vitamin), the barbiturates, the antiseptics, and the anesthetics.

Part II (pp. 157-634) is an alphabetic index of therapeutics.

Part III (pp. 635-731) presents information on closely related subjects (restraint, administration of medicine, nursing, feeding, disinfection, euthanasia, rat extermination, posological tables, and the poison acts), and an addendum of new information released while the book was being compiled.

There is an index of 42 pages.—[*Index to Treatment*. By Hamilton Kirk. Cloth. 773 pages. 154 figures. The Williams and Wilkins Co. Mt. Royal and Guilford Aves., Baltimore 2, Md. 1948. Printed in Great Britain. Price \$10.00.]

### Pregnancy Diagnosis Tests

This book is a review of many important papers on the diagnosis of pregnancy. While chiefly concerned with the methods of diagnosis in women, there is a chapter dealing with the clinical methods applied to domestic animals, notably the cow and the mare.

The tests for pregnancy have been divided into seven classes, chief attention being paid to the gonadotrophic and the estrogenic hormones of the body fluids.

This review of the literature should interest veterinarians engaged in practice in communities where the breeding of dairy cattle and of horses is important. It should also be valuable to those veterinarians who cooperate with hospitals and physicians in maintaining the ani-

mal colonies for making human pregnancy diagnoses. For the student or research worker, the bibliography of almost 2,000 titles will guide supplementary reading.—[*Pregnancy Diagnosis Tests: A review.* By A. T. Cowie. Cloth. 283 pages. Commonwealth Agricultural Bureaux, Central Sales Branch, Penglais, Aberystwyth, Great Britain. 1948. Price 15/-.]

### Security from Foot-and-Mouth Disease

This booklet is a preview of plans being made by the United States Department of Agriculture to increase the security of our livestock industry from foot-and-mouth disease. It details the numerous legal, economic, technical, and safety aspects which surround the problem. Many of these are unfamiliar to most of us, although similar details surround all of the disease eradication programs of the Bureau of Animal Industry.—[*Increasing the Security of the United States from Foot-and-Mouth Disease Through Research. A Description of Prospective Facilities, Safeguards, Projects, and Services to the Community and the Nation.* Issued by the U. S. Bureau of Animal Industry. Paper. 16 pages. 1949.]

### Foot-and-Mouth Disease Control

This is a report of the special subcommittee of the Committee on Appropriations of the U. S. Senate (80th Congress) on a study of the pernicious effect of foot-and-mouth disease as it exists in Mexico and elsewhere, progress of a program to prevent entry of the disease into the United States, the most effective methods of combating and controlling the disease, and the proper location for the authorized research facilities. Much of this information has been presented in the JOURNAL during recent months, but the leaflet contains the authorization for a research laboratory, the requirements for the laboratory site, and the recommendations of the Committee.—[*Control of Foot-and-Mouth Disease. Presented by K. S. Wherry, Chairman, Special Subcommittee. Document No. 211. Paper. 20 pages. U. S. Government Printing Office, Washington, D. C. 1948.*]

### Physicians Handbook

The 1948 edition of this compendium again summarizes information contained in the preceding editions, but adds a section on the diagnosis of poisoning and the treatments of the various types which may occur. Another addition is a table listing the hormones and showing the glands from which they emanate, and the normal function as well as the effects of hypo- and hypersecretion of each.

This booklet continues to be a storehouse of

facts which the veterinarian can use in his daily practice. The fact that it also contains much information not pertinent to veterinary medicine does not detract, since this is a pocket edition, the over-all size being  $4\frac{1}{2} \times 6\frac{1}{2}$  in. If there is a disadvantage, it lies in the fact that the type size is similarly reduced. Type-writer type has been reduced to half its normal size, so that reading is not easy.—[*Physicians Handbook, 5th ed.* By J. Warkentin, M. D., and J. D. Lange, M. D. Paper.  $4\frac{1}{2} \times 6\frac{1}{2}$ . 293 pages. Offset printing. Spiral ring binder. University Medical Publishers, P. O. Box 761, Palo Alto, Calif. 1948. Price \$2.00.]

### Annual Review of Biochemistry

The futility of trying to write an adequate review of this book may be judged from the fact that the book, itself, represents the work of some 36 authors who have reviewed, and abstracted, and condensed more than 4,000 articles and books within the 27 chapters of this book.

Some of the subjects of primary interest to veterinarians are the chemistry and the metabolism of proteins and amino acids, carbohydrates, lipids, and drugs and toxic substances. Chapters are devoted to the biochemistry of the hormones, the vitamins and their clinical aspects, the biochemistry of carcinogenesis, the alkaloids, and the chemistry of penicillin, to mention only a few. The magnitude of this book may be indicated by the fact that the book, itself, represents the work it requires 22 pages to review 118 articles on this subject which have appeared during the past eight years.—[*Annual Review of Biochemistry. Vol. 17.* By J. Murray Luck, Ed. Cloth. 301 pages. Annual Reviews, Inc., Stanford, Calif. 1948. Price \$6.00.]

### Annual Review of Microbiology

This volume follows the usual style of the "annual reviews," being divided into 18 chapters in which 21 authors abstract and condense more than 2,500 articles. Since each paragraph of each chapter is already reduced to its bare essentials, we can hope only to call attention to some of the items which deal specifically with subjects of direct interest to veterinarians. Among these are the antibiotics, the mode of action of chemotherapeutic agents, the inheritance of immunity in animals, and chemical disinfectants. Many other titles deal with subjects almost as directly influencing the practice of veterinary medicine.—[*Annual Review of Microbiology. Vol. 2.* By C. E. Clifton, Ed. Cloth. 532 pages. Annual Reviews, Inc., Stanford, Calif. 1948. Price \$6.00.]

# THE NEWS

## Eighty-Sixth Annual Meeting

*Joint Headquarters — Statler and Book-Cadillac Hotels*

*Detroit, July 11-14, 1949*

On page 174 is a condensed tentative schedule of the 1949 annual session to be held in Detroit, July 11-14, inclusive. As previously announced, the meeting dates this year were set ahead about a month in order to avoid conflict with the 14th International Veterinary Congress to be held in London, England, August 8 to 13, 1949. The schedule shown below is not final but sufficiently firm to enable members, exhibitors, and other interested persons to plan travel and hotel reservations. The attention of all those who must arrive ahead of time is invited to this schedule.



The Book-Cadillac Hotel, Detroit.

### PRE-CONVENTION SESSIONS

**Thursday, July 7**  
a.m.—Committee on Budget  
p.m.—Board of Governors

**Friday, July 8**  
a.m.—Board of Governors  
p.m.—Executive Board

**Saturday, July 9**  
a.m. and p.m.—Executive Board

**Sunday, July 10**  
a.m.—House of Representatives, first session  
Auxiliary Executive Board  
12:00 m.—Registration opens  
p.m.—House of Representatives, second session  
Evening—Open

**Monday, July 11**  
a.m.—House of Representatives, final session

### NEW ARRANGEMENTS

Attention is directed to the plans made to hold a general session on Tuesday evening, July 12. The purpose is to permit the final general session to be held on Thursday morning, July 14, with adjournment at noon. It is believed that this plan will insure a good attendance at the final session and, also, permit those who desire to get an early start for home Thursday afternoon.

Attention is also invited to the plans for alumni dinners on Wednesday evening, July 13. By unanimous agreement, no general banquet will be held this year since the difficulties of arranging a banquet satisfactory to large numbers is almost impossible under present labor and cost conditions. However, the hotel facilities in Detroit this year will permit a return to separate alumni-group functions for which there is practically a unanimous demand. The alumni dinners will, therefore, replace the general banquet of previous years and will be followed by a general assembly for the president's reception and dance in the grand ball room of one of the headquarters hotels. Information indicates that, almost without exception, the alumni groups want the wives included; hence, these dinners will very acceptably replace the social aspects of a general banquet and will undoubtedly be attractive for both alumni and their wives.

### HOTEL RESERVATIONS

Published elsewhere in this issue (ad pp. 42, 43) is a hotel information and reservation



### Deadline Near for 1949 Dues

*If you have not paid your 1949 dues, don't delay any longer. The deadline is April 1, and failure to pay by that time will automatically cause your name to be removed from the JOURNAL mailing list as required by postal regulations and the By-Laws. Prompt payment of dues avoids the annoyance of having your JOURNAL subscription interrupted, even temporarily, and greatly facilitates the work of the AVMA office.*

blank, also a diagram map of downtown Detroit showing hotel locations.

As previously announced, the AVMA Convention this year will utilize joint headquarters, at the Statler and Book-Cadillac hotels. This arrangement is a new one but made necessary by the increasing size and demands of the meeting. Joint headquarters will permit a large percentage of members to be housed in the two hotels, unless they have other preference.

#### GROUP MEETINGS AND LUNCHEONS

The various groups and organizations which customarily meet during the AVMA annual meeting for brief sessions are invited to do so this year. Any interested group is requested to write the AVMA office promptly, if they have not already done so, indicating the type and duration of any session they desire to schedule. Provision can be made for a limited number of luncheon meetings for these groups.

### Coordinated Program Shaped for AVMA Meeting—Plans Include Television

Schedules of section programs for the Detroit meeting, July 11-14, 1949, are nearing completion, following several months of planning by the Committee on Program. The sections on General Practice, Surgery and Obstetrics, and Poultry already have completed their rosters of speakers and subjects, and the sections on Small Animals, Research, and Public Health expect to finish their plans early this month.

Special attention has been given to the formulation of coordinated programs in the various sections. The emphasis is on a balanced program, so as to include papers and discussions on all subjects of current interest in each field.

Among many outstanding features planned for the general sessions is a symposium on "As Others See Us." This will bring together well-known spokesmen from the medical profession, county agents, feed dealers, farmers, breeders,



The Statler Hotel, Detroit, which is joint headquarters with the Book-Cadillac Hotel (see opposite page), for the AVMA Convention, July 11-14, 1949.



extension workers, vocational agriculture teachers, national farm magazine editors, and specialists in animal nutrition.

If tentative plans materialize, television will be utilized, not only as a means of publicizing the convention proceedings, but also as a new

departure in the program of the Section on Small Animals. Officials of a Detroit television station are enthusiastic about the possibilities of a demonstration of fracture fixation in pets. It would be beamed simultaneously to the public audience and to the Section.

### Condensed Tentative Program Schedule

	MONDAY, JULY 11	TUESDAY, JULY 12	WEDNESDAY, JULY 13	THURSDAY, JULY 14
A. M.	Registration. Exhibits open. House of Represent. Various Group Meetings. Committee Meetings. Auxiliary House of Represent.	3 Section Meetings: Small Animals; Poultry; Surgery and Obstetrics. Women's Tour—Greenfield Village, followed by—	3 Section Meetings: General Practice; Public Health; Research. Women's Brunch—9:30 a.m. followed by Annual Meeting of Auxiliary.	General Session: Featured Speakers, Installation of Officers. Adjournment. Various sight-seeing trips for Women, etc.
Noon	Group Luncheons.	Women's Luncheon, Dearborn Inn.	Group Luncheons.	Adjourn.
P. M.	Opening Session Addresses; Awards; Nomination of Officers. Women's Tea, 4:30 p.m. Young Peoples Mixer, 4:30 p.m.	3 Section Meetings: Small Animals; Poultry; Surgery and Obstetrics.	3 Section Meetings: General Practice; Public Health; Research.	
	Group Meetings, 4:30—6:00 p.m.	Group Meetings, 4:30—6:00 p.m.	Alumni Dinners (Separate groups) 6:30—9:00 p.m.	
Night	Open.	General Session: Feature Panel and Speakers.	President's Reception, 9:00 p.m. Dance, 10:00 p.m.	

### State Committees on Ethics

To date, 21 state veterinary associations and Canada have sent lists of the members of their committees on ethics to the AVMA Special Committee on Ethics. The chairmen of these committees are:

State	Chairman
Alabama	M. K. Heath, 213 15th St., North Birmingham.
Arkansas	H. B. Elliott, 418 Second St., Newport.
California	Carl E. Wickett, 203 Administration Bldg., Union Stock Yards, Los Angeles, 11.
Canada	E. L. Houck, Livestock Ranch, Manitoba Dept. of Agriculture, Winnipeg, Manitoba.
Connecticut	George H. Ludins, 322 Prospect St., Hartford.
Illinois	C. L. McGinnis, 3000 North University, Peoria.
Indiana	H. A. Lidikay, Darlington.
Kansas	J. A. Bogue, 1613 East Douglas, Wichita.

State	Chairman
Maine	S. Merrill, Riverside Drive, Augusta.
Massachusetts	F. M. Austin, Belchertown.
Michigan	A. T. McIntyre, Brown City.
Minnesota	H. E. Schwermann, New Ulm.
Mississippi	B. U. Flynn, Canton.
Missouri	F. H. Suits, Odessa.
New Jersey	J. Millar, Deal.
New York	R. S. MacKellar, Sr., 329 West 125th St., New York City.
Oklahoma	C. E. Hoffman, 5302 East 11th, Tulsa.
Pennsylvania	R. C. Snyder, Walnut St. and Copley Rd., Upper Darby.
Virginia	J. B. Woodworth, 202 Arch Ave., Waynesboro.
Washington	L. H. Gaw, East 137 & Bothell, Seattle.
West Virginia	W. E. Trussell, Charles Town.
Wisconsin	T. H. Ferguson, Lake Geneva.

The AVMA Special Committee on Ethics requests that the states not listed send in their committee appointments immediately.

## Membership in 14th International Veterinary Congress Invited

### To VETERINARIANS IN THE UNITED STATES:

Your membership subscription to the 14th International Veterinary Congress, London, Aug. 8 to 13, 1949, is invited, whether or not you plan to make the trip to London. It is the responsibility of the United States Committee to receive and transmit applications from veterinarians in this country to the Organizing Committee in London. We have been asked to prepare an application form, and these are now available on request to the AVMA office, 600 S. Michigan Ave., Chicago 5, Ill.

It is not feasible for the U.S. Committee to mail an application to each of the 14,000 veterinarians, but a supply of the forms has been sent to all veterinary schools, state veterinary associations, state livestock sanitary officials, and veterinary science departments in the state colleges and universities. You can, therefore, obtain an application from the source most convenient to you.

It will be a credit to our country to have a good-sized delegation in attendance at the London Congress. But if you cannot make the journey, send in your application so that your name will appear in the official roster of Congress supporters and so that you will obtain the printed proceedings. The printed report containing the papers presented at the Congress is alone worth the price of membership to many veterinarians.

See the January (p. 42) and February (p. 101) issues of the JOURNAL for previously published information about the Congress and the AVMA European Tour in connection with it. Next month, the JOURNAL will publish the names of reporters from the United States, who have been selected to present papers at the Congress.

Sincerely,

UNITED STATES COMMITTEE ON 14TH INTERNATIONAL VETERINARY CONGRESS

G. H. HART, <i>Chairman</i>	J. G. HARDENBERGH,
A. EICHORN	<i>Secretary</i>
W. A. HAGAN	J. R. MOHLER
C. C. HASTINGS	B. T. SIMMS
J. A. MCCALLAM	H. W. SCHÖNING
	R. L. WEST

### Officers of the Veterinary Division of the Land-Grant Association

A Division of Veterinary Medicine was established in the Association of Land-Grant Colleges and Universities in November, 1948 (see JOURNAL, Jan., 1949: 44).

The officers of the Association of Deans of the American Colleges of Veterinary Medicine have been selected to act as officers of the newly established Division of Veterinary Medicine until its regular organizational meeting in October, 1949. They are: Dean W. A. Hagan, New York State Veterinary College, Cornell University, Ithaca, *chairman*; Dean H. D. Bergman, Division of Veterinary Medicine, Iowa State College, Ames, *vice-chairman*; and Dean C. S. Bryan, School of Veterinary Medi-

cine, Michigan State College, East Lansing, *secretary*.

Dean Bergman will serve on the Executive Committee of the Land-Grant Association until the first full meeting of the Veterinary Division and, to furnish the three required representatives, he will also serve with Deans Hagan and Bryan (divisional representatives) in the Land-Grant Association Senate.

### Board of Governors Meets

President L. M. Hurt, President-Elect C. P. Zepp, Sr., and Executive Board Chairman W. R. Krill were in Chicago on Jan. 22-23, 1949, for a meeting of the Board of Governors. Business transacted included the following items:

1) Approved objections filed by Chairman Krill, and other actions by the central office, in opposing the proposed use of nonveterinarians by the federal government in official tests for tuberculosis, paratuberculosis, and brucellosis (see the February JOURNAL, p. 102).

2) Approved appointment of special committee of practitioners by President Hurt to meet and discuss practitioner participation in federal-state cooperation in disease control programs with representatives of the U. S. Bureau of Animal Industry.

3) Approved the trainee program recently announced by the U. S. Civil Service Commission, whereby veterinary students, after completing the second and third years of the professional curriculum, can be employed during summer vacations in federal-state disease control work.

4) Heard preliminary report on establishment of a veterinary division in the Association of Land-Grant Colleges and Universities.

5) Designated President-Elect C. P. Zepp, Sr., as official AVMA delegate to the 14th International Veterinary Congress in London, Aug. 8-13, 1949.

6) Approved appointment of advisory committee on foreign quarantine requirements for psittacine birds and animals in zoological parks with respect to diseases of public health significance, as requested by the U. S. Public Health Service.

7) Authorized attendance of certain officers and staff members at various meetings and conferences.

8) Referred question of instruction on veterinary subjects in pharmacy schools to Committee on Public Relations.

### Canadian Association Incorporated

The Canadian Veterinary Medical Association was incorporated by an act of the Senate and House of Commons on June 30, 1948. The office is in Ottawa and Dr. E. F. Johnston, Carp, Ont., is the first president of its board of directors. The objectives of the Association are:

1) Advance veterinary medicine and maintain the honor and interests of the veterinary profession.

2) Make provisions for veterinary research.

3) Elevate and sustain professional character and education.

4) Improve relations between members of the profession.

- 5) Improve public relations and promote public health.
- 6) Publish veterinary literature.
- 7) Establish an examining board.
- 8) Standardize qualifications for veterinary science to permit reciprocity between provinces.
- 9) Maintain a directory of veterinarians.
- 10) Make grants of funds for the promotion of veterinary science as deemed wise.
- 11) Be a national body representing the profession as a whole.
- 12) Do such other lawful acts as are incidental or conducive to the attainment of the foregoing objectives and, without being limited to them, to promote the welfare of the veterinary profession in Canada.

### Nonveterinary Participation in Disease Control Program

The *Federal Register* on Feb. 1, 1949, published a proposed amendment to the "regulation for prevention of tuberculosis, paratuberculosis, and Bang's disease of cattle." This was a revision of the amendment proposed Dec. 31, 1948, and reported in the February *JOURNAL* (p. 102, and "AVMA Report" ad page 14).

The official announcement says:

"Some misunderstanding has arisen concerning the objectives of the proposed amendment. Further notice is therefore hereby given that the purpose of the amendment will be to permit payment of claims, under the regulations for the prevention of animal diseases in cooperation with the states (9 CFR Cum. Supp., Part 51), for cattle reacting to tests for Bang's disease when the determination of the existence of this disease is based upon blood samples taken, or laboratory tests made, by nonveterinary technicians under the supervision of veterinarians of the Bureau of Animal Industry, United States Department of Agriculture, or of cooperating state, territorial, county, or municipal veterinary inspectors, as well as when the determination of the existence of such disease is based upon blood samples taken, or laboratory tests made, by such veterinarians or veterinary inspectors, or accredited veterinarians. No change will be made by the amendment in the requirements of the regulations with respect to payment of claims for cattle reacting to tests for tuberculosis or paratuberculosis."

A call to Dr. B. T. Simms, chief of the Bureau of Animal Industry, brought assurance that the BAI will not initiate the steps necessary to implement this authority. Lay technicians are now being used in four states (Alabama, Colorado, Maine, and North Dakota) for the collection of blood samples and the laboratory conduct of the agglutination test. In each instance, the step has been requested by the respective state regulatory officials, and by them only after they had cleared it with officials of the respective state veterinary medical associations.

The special committee appointed by President L. M. Hurt had concluded that lay technicians should not be used to conduct diagnostic brucellosis tests, because this would discourage practitioner cooperation and because the Committee believes that the number of veteri-

narians available during the next few years will be sufficient to carry out the program effectively. This conclusion was relayed to Drs. B. T. Simms and A. K. Kuttler at a conference following the meeting of the Committee.

The development here reported clearly shows what will happen in those areas where practitioners are not sufficiently interested in disease control programs to participate, and especially where interest is so low that the veterinary medical associations recommend the use of lay technicians in conducting these programs.

### Dr. Edwin Laitinen Elected to Executive Board

Drs. R. L. Trader and E. R. Maschgan of Chicago served as tellers on January 17 for the special election in Executive Board District IX (the New England States and New York) and certified the election of Dr. Edwin Laitinen, West Hartford, Conn., to fill the unexpired term, ending in 1952, of Dr. C. P. Zepp, Sr. The vacancy was created when Dr. Zepp became president-elect.



Dr. Edwin Laitinen

Dr. Laitinen is a well-known practitioner and has had previous experience on the Board, having represented his district from 1940 to 1942.

### Inter-American Congress on Brucellosis

Dr. James H. Steele, chief, Veterinary Public Health Division, Communicable Disease Center, U. S. Public Health Service, and Dr. C. K. Mingle, assistant chief, Tuberculosis and Brucellosis Eradication Division, BAI, represented the United States at the Second Inter-American Congress on Brucellosis at Mendoza and Buenos Aires, Argentina, Nov. 17-26, 1948.

The meeting at Mendoza was devoted to research and epizootiology; the Buenos Aires meeting stressed diagnosis and therapy of human brucellosis. The Congress created two permanent committees to study the problems of standardization of human serologic diagnostic methods and animal disease eradication. It was agreed that the antigen of the U.S.D.A. BAI would be the best standard to use, because of its availability. It was further agreed that the disease could not be controlled in man until it was controlled in animals.

### Interstate Action in Rabies Control

Interstate action to check the spread of rabies was initiated by New York, New Jersey, and Pennsylvania in December, 1948, at a conference in New York City. The Conference was sponsored by the New York Joint Legislative Committee on Interstate Cooperation and headed by Assemblyman Harold C. Osterlag.

The three states will coordinate interdepartmental efforts and set up a tri-state committee to synchronize the control work. This action was taken as the result of an epizootic of rabies in central New York state which affects a number of counties bordering New Jersey and Pennsylvania. In New York, the disease is nearly under control as the result of a mass canine vaccination program. The fox is now the chief vector in this state.

Dr. Alexander Zeissig, veterinary consultant of the N. Y. State Health Department, emphasized the importance of public education and voluntary cooperation in mass vaccination programs as the most effective method yet devised for combating canine rabies. Professional trapping and the bounty system will be used to combat rabies in wild vectors.

### STUDENT CHAPTER ACTIVITIES

**Iowa Chapter.**—At the February 9 meeting of the Iowa State College Student Chapter of the AVMA, Dr. Ted Millen, an alumnus, told of his experiences as a missionary in India.

s/ROLAND C. BUNGE, Secretary.

**Ohio Chapter.**—At the December meeting of the Ohio State University Student Chapter of the AVMA, Mr. L. E. Harris, of the Norden Company research department, spoke on "The Veterinarian on the Witness Stand." At this meeting, the Chapter presented a gift of \$100 to Rameau Johnson, a senior who with his wife and three children lost all their possessions in a fire the latter part of November.

s/LEROY G. GUNNING, Secretary.

**Texas Chapter.**—Officers elected at the Dec. 14, 1948, meeting of the Texas A. & M. College Student Chapter of the AVMA were Alvin A. Price, *president*; Richard Botard, *president-elect*; John Swaim, *vice-president*; Max Pachar, *secretary-treasurer*; Harry Doran, *sergeant-at-arms*; Bill Hancock, *reporter*; and Francis Neville, *parliamentarian*. Col. S. C. Smock (KCVC 77), Fort Sam Houston, San Antonio, spoke on "The Function of the Army Veterinary Service."

At the Jan. 11, 1949, meeting, Dr. R. A. Starnes, Dallas, spoke on "Conducting a Small Animal Practice."

s/A. C. SEARS, Reporter.

**Washington State Chapter.**—At the Dec. 7, 1948, meeting of the Washington State Student Chapter of the AVMA, Dr. E. E. Wegner showed slides of the European Veterinary Colleges taken before World War II.

At the meeting on Jan. 4, 1949, the films "Surgery of the Bovine Eye," "Bovine Surgery," and "Home of Champions" were shown.

Dr. Alastair Greig of the Royal (Dick) Veterinary College, Edinburgh, Scotland, spoke on "Veterinary Education in Great Britain. Newly elected officers for the second semester are F. Wedam, *vice-president*; L. Storms, *secretary*; K. Binkley, *treasurer*; J. Bone, *publicity chairman*; and M. Fishback, *athletic director*.

s/EDWARD DIAMOND, President.

### WOMEN'S AUXILIARY

**Mrs. MacDonald, Fourth Vice-President.**—Because of the active part and the important place Canada has always had in the constructive program of the AVMA, it is a privilege to have Mrs. H. S. MacDonald, 51 Oakmont Road, Toronto, as fourth vice-president of the Auxiliary. Her splendid work with the Canadian women enables her to bring about a closer tie between the women of both countries.



Mrs. H. S. MacDonald

Mrs. MacDonald, as a representative of the Executive Board, is interested in new ideas and is cooperating with the local committee in Detroit in making all plans for the ladies' entertainment for the AVMA annual meeting in Detroit, July 11-14, 1949. She represents the Auxiliary with dignity and ability.

Mrs. MacDonald also is sharing in all responsibilities toward the federation program now being developed in the Women's Auxiliary to the AVMA.

s/(Mrs. A. E.) ETHELYN BOTT, President.

**Colorado Auxiliary.**—The Women's Auxiliary to the Colorado State Veterinary Medical Association met on Feb. 21-23, 1949, at the Colorado A. & M. College in Fort Collins. They held a business meeting and were entertained at luncheons, bridge, and an informal banquet.

s/Mrs. LLOYD C. MOSS, Secretary.

**Illinois Auxiliary.**—The seventh annual meeting of the Women's Auxiliary to the Illinois Veterinary Medical Association was held at



the Hotel Abraham Lincoln in Springfield on Jan. 26-28, 1949. After the business meeting, members were entertained at tea, a luncheon, and a breakfast broadcast.

Officers elected at this meeting are Mrs. Carl Horstman, Collinsville, *president*; Mrs. C. M. Rodgers, Blainville, *vice-president*; Mrs. David Smith, Peoria, *secretary*; Mrs. A. S. Turner, Freeport, *treasurer*; Mrs. N. H. Howlett, Springfield, *representative*; and Mrs. R. E. Ruggles, Moline, *alternate*.

s/Mrs. L. R. DAVENPORT, *Secretary*.

**Intermountain Auxiliary.**—Officers of the newly organized Women's Auxiliary to the Intermountain Veterinary Medical Association are Mrs. M. L. Miner, Logan, Utah, *president*; Mrs. J. C. Flint, Salt Lake City, Utah, *first vice-president*; Mrs. C. W. Pitch, Salt Lake City, *second vice-president*; and Mrs. J. I. Curtis, Salt Lake City, *secretary-treasurer*.

s/Mrs. J. I. CURTIS, *Secretary*.

**Kansas Auxiliary.**—The Women's Auxiliary to the Kansas State Veterinary Medical Association met on Feb. 2-4, 1949, at the Allis Hotel, Wichita. They held their business meeting and were entertained at a Dutch brunch, a buffet dinner, and luncheon at the Innes Tea Room.

**Manitoba Auxiliary.**—The Women's Auxiliary to the Veterinary Association of Manitoba met Jan. 14, 1949, at the Fort Garry Hotel in Winnipeg. Members were entertained at lunch, a tour of a mail order department of a commercial firm, and enjoyed the banquet with their husbands.

**Minnesota Auxiliary.**—The Women's Auxiliary to the Minnesota Veterinary Medical Association met at the Hotel Radisson, Minneapolis, on Jan. 3-5, 1949. Members were entertained at a coffee party and the annual luncheon.

s/Mrs. A. J. SCHLADWELER, *Secretary*.

**Mississippi Auxiliary.**—The Women's Auxiliary to the Mississippi State Veterinary Medical Association was organized at the state meeting of the MVMA in Jackson on Jan. 20-21, 1949. Officers are Mrs. J. P. Carney, Meridian, *president*; and Mrs. C. W. Chadwick, Jackson, *secretary-treasurer*.

s/Mrs. C. W. CHADWICK, *Secretary*.

**Ohio Auxiliary.**—At the sixty-fifth annual meeting of the Ohio State Veterinary Medical Association, the Women's Auxiliary was entertained at a luncheon, tour of a department store, social hour, and the banquet in the ballroom of the Deshler-Wallick Hotel, Columbus.

s/Mrs. A. E. FOGLE, *Secretary*.

**Oklahoma Auxiliary.**—Members of the Women's Auxiliary to the Oklahoma State Veterinary Medical Association met Jan. 10-11, 1949, at the Skirvin Tower Hotel in Oklahoma City. At the business meeting, the following officers were elected: Mrs. J. P. Corcoran, Oklahoma City, *president*; Mrs. D. B. Pettette, Oklahoma City, *first vice-president*; Mrs. C. Edwin Hofmann, Tulsa, *second vice-president*; Mrs. W. D.

Bowman, Bethany, *secretary-treasurer*; Mrs. Chester Williams, Butler, *historian*; Mrs. C. A. Love, Nowata, *parliamentarian*. Mrs. Anthony E. Bott, president of the Women's Auxiliary to the AVMA, was a guest at this meeting.

s/Mrs. W. D. BOWMAN, *Secretary*.

**Ontario Auxiliary.**—The Women's Auxiliary to the Veterinary Association of Ontario met Jan. 19-21, 1949, at the Royal Connaught Hotel in Hamilton. The ladies enjoyed a varied and interesting program.

**Tennessee Auxiliary.**—The first annual meeting of the Women's Auxiliary to the Tennessee Veterinary Medical Association was held at the Maxwell House Hotel, Nashville, Jan. 17-18, 1949. In addition to the business meeting, the ladies were entertained at a hospitality hour, sight-seeing, shopping, a broadcast, and the banquet.

Officers elected were Mrs. H. W. Nance, Lawrenceburg, *president*; Mrs. W. R. Lawrence, Dyersburg, *first vice-president*; Mrs. A. C. P. Andersen, Nashville, *second vice-president*; Mrs. Tyler Young, Kingsport, *third vice-president*; Mrs. Hugh Lamb, Athens, *secretary*; and Mrs. W. O. Greene, Nashville, *treasurer*.

s/Mrs. G. E. EASON, *Secretary*.

**Texas Auxiliary.**—Members of the Women's Auxiliary to the Texas State Veterinary Medical Association held their twenty-fifth annual meeting on Jan. 17-19, 1949, at the Texas Hotel in Fort Worth. Mrs. Anthony E. Bott was a guest at this meeting. Officers elected were Mrs. R. R. Childers, Jasper, *president*; Mrs. F. L. Gunn, Lagrange, *vice-president*; and Mrs. Charles Boyd, Grand View, *secretary-treasurer*.

The Panhandle and Houston auxiliaries were also represented at this meeting. Officers of the Panhandle Auxiliary are Mrs. N. A. Cox, Lubbock, *president*; Mrs. J. W. Williams, Colorado City, *vice-president*; and Mrs. W. T. Rogers, Lubbock, *secretary-treasurer*.

Officers of the Houston Auxiliary are Mrs. M. C. Coop, *president*; Mrs. Henry Fisherman, *vice-president*; and Mrs. J. W. Williamson, *secretary-treasurer*.

s/Mrs. CHARLES BOYD, *Secretary*.

## APPLICATIONS

The listing of applicants conforms to the requirements of the administrative by-laws—Article X, Section 2.

### First Listing

BAY, WILLIAM W.

Bldg. 1, Apt. 8, Rose Ade Drive, West Lafayette, Ind.

D.V.M., Texas A. & M. College, 1948.

Vouchers: L. M. Hutchings and M. Lowe.

BRITO, ROBERTO J.

Dominguez No. 504, Cerro, Havana, Cuba.

D.V.M., University of Havana, 1946.

Vouchers: M. Stincer and A. M. Morales.

BURDICK, HOWARD E.

15348 Ward Ave., Detroit 27, Mich.

B.V.Sc., Ontario Veterinary College, 1926.

Vouchers: B. J. Killham and J. G. Harderbergh.



**BUTLER, GLENN C.**

3566 Port Arthur Rd., Beaumont, Texas.

D.V.M., Texas A. &amp; M. College, 1948.

Vouchers: J. H. Milliff and R. D. Turk.

**DOUGLAS, SAMUEL E.**

315 N. Cherokee Ave., Tahlequah, Okla.

D.V.S., Western Veterinary College, 1906.

Vouchers: O. E. Robinson and C. C. Hisel.

**FORNEY, HOMER S.**

4 Campbelltown Rd., Palmyra, Pa.

V.M.D., University of Pennsylvania, 1937.

Vouchers: F. A. Lentz and J. D. Beck.

**FOWLER, THOMAS A.**

2108 W. 50th Terrace, Kansas City 2, Mo.

D.V.M., Kansas City Veterinary College, 1913.

Vouchers: J. Farquharson and T. A. Meininger.

**FYE, DONOVAN N.**

3231 W. French, San Antonio, Texas.

D.V.M., Texas A. &amp; M. College, 1948.

Vouchers: W. A. Lawrence and W. Z. Burke.

**GALBRATH, WILLIAM T.**

405 W. Penn St., Camden, N. J.

B.V.Sc., Ontario Veterinary College, 1917.

Vouchers: E. M. Lynn and T. E. Sanders.

**GIVEN, JOSIAH A.**

1821 Bemidji Ave., Bemidji, Minn.

D.V.M., McKillip Veterinary College, 1919.

Vouchers: C. H. Wetter and H. Hedin.

**GOUGE, HARDIN E.**

711 W. Main St., Sedalia, Mo.

D.V.M., Texas A. &amp; M. College, 1938.

Vouchers: J. L. Wells and G. L. Dunlap.

**HIPENBECKER, RALPH B.**

Fennimore, Wis.

D.V.M., Indiana Veterinary College, 1922.

Vouchers: O. Norling-Christensen and W. R. Winner.

**LINN, FRANK J.**

Sheffield, Iowa.

D.V.M., Iowa State College, 1938.

Vouchers: R. O. Dorweiler and J. C. Kaiser.

**LINN, SAMUEL D.**

Humboldt, Iowa.

D.V.M., Iowa State College, 1941.

Vouchers: P. O. Dorweiler and J. P. Jorgensen.

**MCCALLUM, DANIEL W.**

513 Crittenden St., N. W., Washington 11, D. C.

D.V.M., United States College of Veterinary Surgeons, 1918.

Vouchers: C. Kelly and E. B. Smith.

**MYERS, CARLTON H.**

Box 799, Americus, Ga.

D.V.M., Alabama Polytechnic Institute, 1947.

Vouchers: R. T. Stapleton and S. F. Stapleton.

**PAGE, HARVEY F.**

P.O., Box 428, Washington, Ind.

D.V.M., Ohio State University, 1932.

Vouchers: O. Norling-Christensen and H. A. Lidikay.

**RIEKE, RALPH W.**

400 S. Jefferson St., New Ulm, Minn.

D.V.M., Iowa State College, 1943.

Vouchers: G. R. Fowler and C. H. Covault.

**SANTAMARIA, SERAFIN**

Buenos Aires No. 32, Cerro, Havana, Cuba.

D.V.M., University of Havana, 1917.

Vouchers: M. Valdes F. and J. M. Cortizo.

**STRATMEYER, ERNEST H.**

657 Leva St., Hillsboro, Ill.

D.V.M., Alabama Polytechnic Institute, 1943.

Vouchers: O. Norling-Christensen and C. H. Gurley.

**Second Listing**

Barrette, Jean-Marie, Dept. of Agric., Bathurst, N.B., Canada.

Briggs, Walter S., 286 Sycamore St., East Aurora, N. Y.

Cranston, Raymond E., 2436 S. Hilyard, Eugene, Ore.

Dayton, Roland C., R. D. No. 2, Allison Park, Pa.

Dimon, Charles E., 1181 Calada St., Los Angeles 23, Calif.

Hevia, Gerardo, Pezuela No. 46, Cojimar, Havana, Cuba.

Kjeldsen, Robert F., 412 E. Morgan, Chester, Ind.

Noethe, Edward M., Slayton, Minn.

Stieber, Sam, 18 K River View Gardens, North Arlington, N. J.

Toro, Eduardo E., P. O. Box 3487, Santurce, P.R.

Vardaman, Thomas H., P. O. Drawer 952, Auburn, Ala.

**U. S. GOVERNMENT****U. S. Livestock Inspector Slain in Mexico.**

Mr. Robert L. Proctor, 22, of Tucson, Ariz., U.S. BAI livestock inspector assigned to the foot-and-mouth disease vaccination program in Mexico, was slain during an "outbreak of violence" near the Municipio of Tomascalcingo, the USDA reports under date of February 2. The vaccination crew to which Proctor belonged was attacked and beaten by "more than 200 natives." Mexican members of the crew also were beaten, but none fatally. This is the first instance of open hostility toward the vaccination program, according to the Mexican-United States Commission for the Eradication of Foot-and-Mouth Disease.

**AMONG THE STATES AND PROVINCES****Alberta**

**Annual Convention.**—The forty-third annual convention of the Veterinary Medical Association of Alberta was held June 18-19, 1948, at the Masonic Temple in Edmonton. Officers elected were Drs. J. Gordon Anderson, Calgary, president; J. C. Carney, Lethbridge, vice-president; and J. C. Wainwright, Calgary, secretary-treasurer.

s/J. C. WAINWRIGHT, Secretary.

**Arkansas**

**State Association.**—The thirty-third annual meeting of the Arkansas Veterinary Medical Association was held in the Hotel Marion in Little Rock on Feb. 17-18, 1949. After the business meeting, the scientific program was presented.

DR. N. D. CRANDALL, Department of Small Animal Medicine and Surgery, Alabama Polytechnic

Institute, Auburn: "Canine Leptospirosis" and "Medullary Pinning" (with illustrations).

DR. E. J. FRICK, Department of Surgery and Medicine, School of Veterinary Medicine, Kansas State College, Manhattan: "Diagnosis and Treatment of Equine Digestive Disturbances" and "Feline Practice."

DR. ALLEN RICE, Inspector in charge, Arkansas BAI, led an open forum on "Brucellosis."

s/T. D. HENDRICKSON, *Secretary*.

## California

**State Officers.**—Officers elected at the mid-winter conference of the California State Veterinary Medical Association in San Luis Obispo on Jan. 10-12, 1949, were Drs. S. Michael, San Francisco, *president*; Floyd Wilcox, Los Angeles, *vice-president*; Oscar J. Kron, San Francisco, *treasurer*; and Mr. Charles S. Travers, *executive secretary*.

s/C. E. WICKTOR, *Resident Secretary*.

**Southern Association Officers.**—The annual installation of the officers of the Southern California Veterinary Medical Association was held at a dinner dance at the Hollywood Roosevelt Hotel, Hollywood, on Jan. 19, 1949. The following officers were installed: Drs. A. Mack Scott, Los Angeles, *president*; Herbert I. Ott, Bellflower, *first vice-president*; K. R. Wilcox, Los Angeles, *second vice-president*; and D. H. McDole, Los Angeles, *secretary-treasurer*.

s/C. E. WICKTOR, *Resident Secretary*.

**Examination for Veterinarians.**—The San Francisco Civil Service Commission announces a nation-wide examination for veterinarians. Applicants must be citizens of the United States, graduates of an approved veterinary school, and must be at least 21 years old.

Duties include inspection of live animals or carcasses for disease, premises where animals are kept or slaughtered, and related duties as required. Salary ranges from \$330 at entrance to \$400 maximum per month for a five-day week of forty hours. Nonresidents who cannot appear in San Francisco for these examinations must indicate this on the application and the Civil Service Commission will attempt to make arrangements to hold these examinations at convenient places throughout the United States.

Applications must be received by April 15, 1949. Beginning date of examination is April 29, 1949. For further details write Guy Hayler, civil service examiner, 151 City Hall, San Francisco, Calif.

**The Growing Chinchilla Industry.**—Ninety per cent (more than 40,000) of all the domesticated chinchilla in the world are in North America. The care and treatment of these animals are the responsibility of the veterinary profession. There has been some unpleasant publicity because a few veterinarians have failed to show an interest in medical and surgical problems of the chinchilla. If veterinarians do not accept this challenge, charlatans will attempt to take their place and all will suffer by their mistakes. The combined efforts of both veterinarians and professional workers in the chinchilla field are necessary for the suc-

cess of this industry.—Hilan F. Keagy, D.V.M., Los Angeles 24, Calif.

## Colorado

**State Association.**—The tenth annual conference for veterinarians, sponsored by the Division of Veterinary Medicine, Colorado A. & M. College, Fort Collins, was held Feb. 21-23, 1949, at the College. After opening addresses by Drs. I. E. Newsom, president of the College, and F. Cross, dean of the Division of Veterinary Medicine, the scientific program was presented. Drs. Delahanty, Farquharson, Jensen, and Moss, who are among those appearing on the program, are members of the faculty of the Division of Veterinary Medicine at Colorado A. & M. College.

DR. D. D. DELAHANTY: "Calculi in Cattle."

DR. RUE JENSEN: "Hyperkeratosis (X Disease) in Cattle."

DR. L. C. MOSS: "Canine Surgical Cases" (with illustrations).

DR. A. GORDON DANKS, Department of Surgery and Clinics, University of Illinois, Urbana: "Common Lameness of the Trotter and Pacer" and "Horse Breeding Problems."

DR. L. E. HARRIS, Harris Laboratories, Lincoln, Neb.: "Fraudulent Practices and Their Detection by the Veterinarian on the Race Track."

DR. GERRY B. SCHNELLE, the Angell Memorial Animal Hospital, Boston, Mass.: "X-Ray Diagnosis in Small Animal Practice," "Surgical Procedures in Small Animals," and "Treatment of the Aged Dog."

DR. J. FARQUHARSON: "Some of the Common Lamenesses of the Thoroughbred."

DR. T. ROBERT PHELPS, Vancouver, Wash.: "Field Observations on the Effect of Ingested Fluorine in Cattle."

DR. J. B. HARRISON, Portland, Ore.: "Routine Procedures and Duties of the Veterinarian in Dog Racing" and "Disease and Accidents Incident to Work of the Coursing Hound."

DR. R. S. GUTHRIE, DeKalb, Ill.: "Mastitis Control Through Managed Milking."

DR. ERIC F. PALLISTER, Ottawa, Ont.: "Advancement in the Production of Rinderpest Vaccine in World War II."

DR. EARL M. BALDWIN, JR., Omaha, Neb.: "Biological Agents and Their Use in Controlling Ovine Enterotoxemia."

DR. LOUIS MADSEN (Ph.D.), Department of Animal Husbandry, Utah State Agricultural College, Logan: "Veterinary Aspects of Animal Nutrition."

s/JAMES FARQUHARSON.

**Personal.**—Dr. James Farquharson (COLO 21), head, Department of Surgery and Clinics, Colorado A. & M. College, Ft. Collins, was appointed to the Colorado Horse and Dog Racing Commission by Governor Lee Knous on Dec. 31, 1948. One of three members appointed, he is to serve a four-year term.

s/W. P. BLAKE, *Secretary*.

## Connecticut

**State Association.**—The Connecticut Veterinary Medical Association met Feb. 2, 1949, at the Hotel Bond, Hartford. After the business meeting, the scientific program was presented.

DR. LINCOLN ESTEBROOK, extension veterinarian, Storrs Experiment Station, Storrs: "The New Veterinary Extension Program."

MR. PAUL HELLER, superintendent, Connecticut Artificial Breeding Association, Woodbridge: "Modern Artificial Breeding Practices."

DR. GEORGE E. CORWIN, state veterinarian.

Hartford: "Reminiscence of an Official Veterinarian."

Officers elected at this meeting were Drs. Charles P. Hines, Salisbury, *president*; Raymond E. Larson, Newington, *first vice-president*; Howard C. Raven, Bridgeport, *second vice-president*; and E. H. Patchen, Milford, *secretary-treasurer*. Members of the Board of Censors are Drs. J. P. MacIntosh, G. H. Ludins, Walter Holcombe, C. E. Guthrie, and Andrew Draper.

s/EDWIN LAITINEN, *Resident Secretary*.

**Personal.**—Dr. G. E. Corwin (USCVS '03), Hartford, state veterinarian of Connecticut for many years, was retired on Jan. 1, 1949, because of age limit but will continue in office until July 1, 1949, to train the incoming state veterinarian, Dr. Jean V. Smith (CORN '29), South Norwalk.

### District of Columbia

**District Association.**—The District of Columbia Veterinary Medical Association met in the Pan American Room of the Mayflower Hotel on Jan. 27, 1949. Dr. Mason Weadon reported on the San Francisco session of the AVMA, and Lieut. Col. Frank A. Todd spoke on "United States Army Veterinary Service in Germany." Officers for the ensuing year are Brig. Gen. James A. McCallam, *president*; and Dr. Clarence H. Thompson, Jr., *secretary-treasurer*.

s/CLARENCE H. THOMPSON, JR., *Secretary*.

**Veterinarian Attends Animals in Inaugural Parade.**—Dr. John Rodman Keeler (UP '43), who owns the Silver Spring Veterinary Hospital, was on hand at the inaugural parade of President Harry S. Truman to attend the horses, mules, and other animals in the parade. All animals were checked on arrival and remained under the care of Dr. Keeler throughout their stay in the capitol city.

**Personal.**—Dr. Crosby Kelly (USCVS '18), veterinarian at the clinic of the Animal Rescue League, was featured in an article "Medical Aid for Animals" in *The Sunday Star Pictorial Magazine* for Feb. 6, 1949. Dr. Kelly said that in his eighteen years of ministering to all types of animals he has learned almost as much about human nature as he has about animal physiology.

### Florida

**State Officers.**—Officers of the Florida State Veterinary Medical Association elected at the annual meeting in October, 1948, are Drs. C. Paul Vickers, Tallahassee, *president*; D. A. Sanders, Gainesville, *vice-president*; and V. L. Bruns, Williston, *relected secretary-treasurer*.

s/V. L. BRUNS, *Secretary*.

### Illinois

**State Association.**—The sixty-seventh annual convention of the Illinois State Veterinary Medical Association was held Jan. 26-28, 1949, at the Hotel Abraham Lincoln in Springfield. After the opening address by Dr. L. M. Hurt, president of the AVMA, the scientific program was presented.

DR. JAMES FARQUHARSON, head, Department of Veterinary Surgery and Clinics, Colorado A. & M. College, Fort Collins: "Veterinary Surgery" and "Beef Cattle Practice."

DR. JERRY SOTOLA (Ph.D.), Armour and Co., Chicago: "Nutritional Research and its Application to the Practice of Veterinary Medicine."

DR. L. R. DAVENPORT, consultant in veterinary medicine, Division of Communicable Diseases, Department of Public Health, Springfield: "The Veterinary Profession, Animal Disease, and Public Health."

DR. O. NORLING-CHRISTENSEN, member of the AVMA Executive Board, Wilmette: "AVMA Affairs."

DR. C. E. FIDLER, superintendent of livestock industry, Springfield: "Recent Developments in Brucellosis and Tuberculosis Control Measures in Illinois."

DR. CARL F. SCHLOTTHAUER, Department of Veterinary Medicine, The Mayo Foundation, Rochester, Minn.: "The Veterinarian and His Responsibilities to the Community" and "Canine Surgical Problems" (with illustrations).

DR. J. GARROTT ALLEN (M.D.), associate professor of surgery, University of Chicago, and Argonne National Laboratory: "X Radiation Injury in Animals."

MR. JOHN W. NEAL, executive secretary, Committee on Medical Service and Public Relations, Illinois Medical Society: "Socialized Medicine."

DR. J. F. KNAPPENBERGER, Ashe Lockhart, Inc., Kansas City, Mo.: "Digestive Disorders of Cattle."

DR. A. GORDON DANKS, head, Department of Veterinary Clinical Medicine, University of Illinois College of Veterinary Medicine, Urbana: "Diagnosis of Lameness in Horses."

DR. F. B. YOUNG, Waukegan, Iowa: "Obstetrics in Swine."

DR. R. T. FIREOVED, Wilmette: "Surgical Problems in Our Practice."

DR. G. B. SCHNELLE, the Angell Memorial Animal Hospital, Boston, Mass.: "X-Ray Diagnostics in Small Animal Practice" (with illustrations).

DR. G. E. WAKERLIN (Ph.D., M.D.), head, Department of Physiology, University of Illinois Medical School, Chicago: "Interrelations of Human and Veterinary Medicine."

DR. W. A. ALBRECHT (Ph.D.), chairman, Department of Soils, University of Missouri, Columbia: "Soil Fertility—Its Relation to Animal Health."

DR. R. E. WITTER, Department of Veterinary Clinical Medicine, University of Illinois College of Veterinary Medicine, Urbana: "The Management of Otitis Externa in the Dog" (with illustrations).

DR. J. A. BUTTERWORTH, Highland Park, was moderator of a panel discussion on "Diseases of Small Animals." Other members of the panel were Drs. R. T. Fireoved, C. F. Schlotthauer, G. B. Schnelle, and R. E. Witter.

DR. H. E. MOSES, associate Pathologist, Purdue University, Agricultural Experiment Station, Lafayette, Ind.: "Diagnosis and Vaccination in Newcastle Disease."

DR. H. C. H. KERNKAMP, Department of Veterinary Medicine, University of Minnesota, St. Paul: "Swine Brucellosis."

DR. W. M. COFFEE, LaCenter, Ky.: "General Mixed Practice."

s/A. G. MISENER, *Secretary*.

**Chicago Association.**—The Chicago Veterinary Medical Association met on Jan. 11, 1949, in the Palmer House. Dr. W. A. Magrane, Mishawaka, Ind., spoke on "Surgery of the Eye." Officers elected at this meeting were Drs. Preston Hoskins, *president*; Guilford Elwood, *vice-president*; and Robert C. Glover, *relected secretary-treasurer*. Dr. J. R. Robb, was elected delegate to the state association.

At the Feb. 8, 1949, meeting, Dr. W. A. Young reported on the proceedings of the California State Veterinary Association meeting and dis-

cussed "Q Fever." The committee on rabies held an open discussion on rabies and Dr. R. C. Klussendorf, assistant executive secretary of the AVMA, showed two public health films, one on diagnosis and one on control of rabies.

The ladies were entertained at bridge.

s/ROBERT C. GLOVER, *Secretary*.

**Public Health Practices.**—The Illinois Department of Public Health will sponsor an Institute on Public Health Practices for Veterinarians in Springfield on March 21-23, 1949. The program is designed to acquaint veterinarians with the three basic public health practices, i.e., epizootiology, public health education, and disease prevention and control. The recognition of the fact that animal diseases transmissible to man can be controlled only at the animal source emphasizes the important rôle of the veterinary practitioner in disease control and in the over-all public health program.

The following veterinarians will be on the program: Drs. James H. Steele, chief veterinarian, Public Health Division, U. S. Public Health Service, Atlanta, Ga.; O. H. Seher, chief, Meat Inspection Division, U. S. BAI, Chicago; R. M. Carter, president, Illinois State Veterinary Medical Association, Alexis; C. S. Bryan, dean, School of Veterinary Medicine, Michigan State College, East Lansing; Robert Graham, dean, College of Veterinary Medicine, University of Illinois, Urbana; N. H. Howlett, veterinarian in charge, U. S. BAI, Springfield; L. R. Davenport, consultant in veterinary medicine, Illinois Department of Public Health; and R. C. Klussendorf, assistant executive secretary, AVMA, Chicago.

Drs. L. R. Davenport, C. E. Fidler, and N. H. Howlett will preside over the second, fourth, and fifth sessions.

## Indiana

**Association Officers.**—Officers elected at the sixty-fifth annual meeting of the Indiana Veterinary Medical Association on Jan. 13-15, 1949, are Drs. H. A. Lidikay, Darlington, *president*; C. Harvey Smith, Crown Point, *vice-president*; and W. W. Garverick, Zionsville, *secretary-treasurer*. Members of the Board of Directors are Drs. M. M. Coble, Columbia City, *chairman*; G. Robert Oldham, Kokomo, *co-chairman*; and E. W. Spieth, Jeffersonville; Frank H. Brown, Indianapolis; Paul H. Wallace, Cynthiana; and E. S. Weisner, Goshen.

s/W. W. GARVERICK, *Secretary*.

**Personal.**—Because of ill health, Dr. G. W. Hamilton (IND '10), Southport, Ind., has retired from the U. S. BAI after thirty years of service. Dr. Hamilton was supervisor of tuberculosis eradication in Indiana.

## Iowa

**State Association.**—The sixty-first annual meeting of the Iowa Veterinary Medical Association was held Jan. 18-20, 1949, at Des Moines. The scientific program follows.

DR. F. E. BRUTSMAN, Traer: "Dairy Cattle Practice."

DR. L. M. HURT, Los Angeles, Calif., president,

AVMA: "American Veterinary Medical Association Affairs" and "Comments on Brucellosis, Q Fever, X Disease, and Disease Field Control."

DR. J. W. CUNKELMAN, special representative, Fort Dodge Laboratories, Inc., Fort Dodge: "Breeding Unsoundness in Cows."

DR. JERRY SOTOLA (Ph.D.), assistant director, Armour's Livestock Bureau, Chicago, Ill.: "Research Achievements of Interest to the Veterinary Profession."

DR. FRANK THORP, JR., Department of Animal Pathology, School of Veterinary Medicine, Michigan State College, East Lansing: "Diseases of Breeding Ewes and Feedlot Lambs."

DR. R. J. BEAMER, Ottumwa: "Case Reports" (with illustrations).

DR. JOHN W. CAREY, West Liberty: "Best Cattle Practice."

DR. GREG RAPS, assistant manager, Dairy Genetics, Inc., Des Moines: "The Veterinary Practitioner and the County Artificial Breeding Association."

DR. GEORGE R. BURCH, director, Research Farm, Pitman-Moore Co., New Augusta, Ind.: "Mastitis."

DR. C. D. LEE, assistant extension veterinarian, Iowa State College, Ames: "Poultry Diseases."

DR. H. D. BERGMAN, dean, Division of Veterinary Medicine, Iowa State College, Ames: "Current Trends in Veterinary Education."

DR. W. F. IRWIN, Tulsa, Okla.: "Small Animal Practice."

DR. R. M. HOFFERD, the Corn States Serum Co., Cedar Rapids: "Swine Diseases."

DR. W. E. PETERSEN (Ph.D.), Division of Dairy Husbandry, University of Minnesota, St. Paul: "Nutrition of Farm Animals."

DR. A. H. QUIN, head, Professional Service, Jensen-Salsbery Laboratories, Inc., Kansas City, Mo., was chairman of a panel discussion on "General Practice." Other panel members were Drs. F. E. Brutsman, G. R. Burch, J. W. Carey, J. K. Dewar, R. M. Hofferd, L. M. Hurt, W. F. Irwin, C. D. Lee, W. E. Petersen, G. Raps, and J. Sotola.

Drs. H. U. Garrett, chief, Division of Animal Industry; John Patterson, Patterson-Harwood Laboratories; and Charles W. Brown, veterinarian in charge, U. S. BAI, all of Des Moines; and William A. Owens (Ph.D.), head, Department of Psychology, Iowa State College, Ames, also participated in the program.

Officers elected at this meeting were Drs. J. D. Shoeman, Atlantic, *president*; J. K. Dewar, Cherokee, *president-elect*; R. J. Beamer, Ottumwa, *first vice-president*; F. S. Sharp, Ute, *second vice-president*; Frank B. Young, Waukeo, *secretary-treasurer*; and H. C. Smith, Sioux City, *member Executive Board, first district*.

s/J. H. KRICHEL, *Resident Secretary*.

**East Central Society.**—The East Central Iowa Veterinary Medical Society met on Dec. 9, 1948, at the Hotel Roosevelt in Cedar Rapids. Dr. E. H. Baldwin, Omaha, Neb., spoke on "Enterotoxemia (Over-eating Disease) in Lambs," and Dr. William H. Lynch, Cedar Rapids, discussed "Pneumonias in Swine."

At the Jan. 13, 1949, meeting in Cedar Rapids, Dr. E. A. Benbrook, head, Veterinary Pathology Department, Iowa State College, presented an illustrated talk, "Animal and Poultry Parasites." Dr. Joe Giffey, U. S. BAI, hog cholera and swine disease specialist, gave a report on "Swine Erysipelas Control in Eastern Iowa During the Past Five Years."

s/E. C. HOWE, *Secretary*.

**Encephalomyelitis.**—Sixty-six cases of equine



encephalomyelitis, with 14 fatalities, were reported in Iowa during 1948, according to Drs. H. U. Garrett, chief, Division of Animal Industry, and C. W. Brown, acting veterinarian in charge, U. S. BAI. The report also revealed that the highest peak of incidence again occurred, as it has for several years, following the high point of precipitation and temperature. The cases and deaths for the year are the lowest yet reported. The Eastern type was not recognized in the state. During the year, 1,629 horses and mules were vaccinated.

## Kansas

**State Association.**—The forty-fifth annual convention of the Kansas Veterinary Medical Association was held Feb. 2-4, 1949, at the Allis Hotel in Wichita. After the opening address by President C. W. Bower, the scientific program was presented.

DR. BENJ. J. SWARTZ (Ph.D.), chief, Zoological Division, BAI, Washington, D. C.: "Parasitisms as Factors in Livestock Production, with Indicated Control Measures."

DR. J. D. RAY, Corn States Serum Company, Omaha, Neb.: "Enterotoxemia in Lambs" and "Pulmonary and Enteric Diseases of Swine."

DR. R. B. KOGER, Joplin, Mo.: "Some Practical Small Animal Therapeutics."

DR. T. J. LEASURE, Lawrence: "Discussion on General Practice."

DR. CHAS. W. JACKSON, Iola: "The Importance of Poultry Practice to the Veterinarian."

DR. JERRY SOTOLA (Ph.D.), Armour and Co., Chicago, Ill.: "Recent Research in Nutrition as it Applies to the Veterinary Profession."

DR. A. F. WEMPE, Marysville: "Modern Day Horse Practice."

DR. A. H. RILEY, Gardner: "Duties of an Official Veterinarian at Horse Shows." Dr. F. B. Jones, assistant inspector, BAI, Topeka, led a discussion of this paper.

s/OLIN W. MORRIS, *Secretary*.

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**District Meetings.**—The Kansas Veterinary Medical Association is divided into eight districts. Most districts hold from two to six meetings a year. The following meetings were held recently.

District VIII met at Parsons, Oct. 30, 1948. Dr. A. A. Case of the School of Veterinary Medicine, University of Missouri, Columbia, was the guest speaker. Officers are Drs. G. A. Mullen, McCune, *president*; and Roy L. McConnell, Coffeyville, *secretary-treasurer*.

District III met Nov. 14, 1948, in Council Grove. Dr. Thos. P. Crispell, Parsons, spoke on "General Practice Problems." Officers of the Association are Drs. Frank Jordan, Abilene, *president*; and A. V. Schwartz, Salina, *secretary-treasurer*.

District IV met in Wichita on Jan. 8, 1949. Dr. W. E. Logan addressed the meeting on "The New Brucellosis Program." Dr. Roger Coffman, Wellington, is *president*; and Dr. George Allen, Wichita, *secretary-treasurer* of this association.

s/C. W. BOWER, *Resident Secretary*.

## Louisiana

**Short Course.**—The eighteenth annual short course for the Louisiana Veterinary Medical Association, conducted by the Louisiana State University, College of Agriculture, was held

Feb. 8-9, 1949, at the Agricultural Center, Baton Rouge. After President K. W. Franks' address, the scientific program was presented.

DR. R. T. DICKINSON, Dallas, Texas: "Distemper Vaccination," "Anesthesia in Pets," and "Management and Records of a Veterinary Hospital."

DR. W. J. GIBBONS, head, Division of Large Animal Surgery and Medicine, Alabama Polytechnic Institute, Auburn: "The X Disease Complex" (with illustrations) and "The Milk Fever Complex."

MR. J. B. FRANCHI: "Preparation of Food for Storage."

DR. A. H. GROTH, director, Regional Animal Disease Research Laboratory, Auburn: "Functions and Accomplishments of the Regional Laboratory" and "Paratuberculosis."

DR. W. G. BROCK, Dallas, Texas: "The AVMA Executive Board and Its Functions" and "Equine Practice."

MR. W. E. ANDERSON, commissioner of agriculture, Baton Rouge: "The Program of the Louisiana Livestock Sanitary Board."

DR. LELAND C. GRUMBLES: "Newcastle Disease" (with illustrations).

Dr. Grumbles and Mr. Franchi are members of the faculty of the Louisiana State University.

The motion pictures "Surgery of the Bovine Eye," (Farquharson) "Ergot Poisoning," "Lung Worms," and "Infectious Anemia at Rockingham Park" (BAI) were shown.

s/C. M. HEFLIN, *Secretary*.

## Manitoba

**Provincial Association.**—The fifty-ninth annual meeting of the Veterinary Association of Manitoba was held Jan. 14, 1949, at the Fort Garry Hotel in Winnipeg. The scientific program follows.

MR. J. R. BELL, provincial livestock commissioner: "Where is Manitoba's Livestock Industry Heading?"

DR. R. A. McINTOSH, Guelph, Ont.: "Large Animal Clinical Cases" (with illustrations).

MR. J. S. SKAPTASON, Winnipeg: "The Hornfly, Its Effect and Control."

DR. A. SAVAGE, Winnipeg: "Nitrate Poisoning of Cattle."

DR. C. E. CHAMBERLAYNE, Winnipeg: "The Veterinarian in Public Health."

DR. E. N. ANDERSON, Norwood: "Attending Thoroughbreds."

Officers elected at this meeting were Drs. O. McGuirk, *president*; E. C. Chamberlayne, *vice-president*; and J. M. Isa, *secretary-treasurer*. Other members of the Council for 1949 are Drs. R. H. Lay, A. Savage, D. J. Lawson, and J. Arbuthnott. Drs. A. Savage, R. H. Lay, and J. Arbuthnott were elected to the Board of Examiners, and Drs. E. J. Rigby and A. D. Pickell, auditors.

s/J. M. ISA, *Secretary*.

## Maryland

**Personal.**—Dr. R. T. Habermann (MSC '36), formerly with the U. S., BAI in the Zoological and Pathological Divisions, has been appointed veterinarian in the U. S. Public Health Service and assigned for research work in the Comparative Pathology Unit, Pathology Laboratory, National Institutes of Health, Bethesda, Md.

## Massachusetts

**State Association.**—The regular meeting of the Massachusetts Veterinary Association was held at the Hotel Statler on Jan. 26, 1949. After the social hour, the business meeting was held and Dr. Raymond A. Keiser, dean, School of Veterinary Medicine, University of Pennsyl-



vania, spoke on "Immunological Factors of Importance in Virus Diseases."

s/C. LAWRENCE BLAKELY, *Secretary*.

## Michigan

**Postgraduate Conference.**—The twenty-sixth annual postgraduate conference for veterinarians of the Michigan State College was held at the College, East Lansing, on Jan. 19-20, 1949. The program follows. Speakers not otherwise identified are members of the faculty of the Michigan State College, School of Veterinary Medicine.

DR. F. E. EADS: "Sulfa Blood Levels."

DR. I. F. HUDDLESON: "The Ring Test for Brucellosis."

DR. W. O. BRINKER: "Splint Demonstrations" and "Intramedullary Splints."

DRS. C. S. BRYAN, V. P. LaBRANCHE, and W. F. JACKSON: "Udder Medication."

DRS. G. R. MOORE and J. P. NEWMAN: "Vibrio Fetus Examination."

DR. E. A. WHITE: "Inventions and Patents."

DR. F. W. YOUNG: "Local Anesthetics for Foot Lameness."

DRS. G. R. MOORE, W. R. RILEY, and E. A. WHITE: "Anaplasmosis in Michigan."

DR. J. C. CAREY, West Liberty, Iowa: "The Milk Fever Complex" and "Beef Cattle Diseases."

MR. F. S. LEEDER, director, Bureau of Disease Control, Michigan Department of Health, East Lansing: "Rabies in Michigan."

DR. W. J. GIBBONS, College of Veterinary Medicine, Alabama Polytechnic Institute, Auburn, Ala.: "X Disease" and "Large Animal Practice."

DR. W. K. APPELHOF, Detroit: "Animal Diseases in the Zoo."

DR. J. W. CUNKELMAN, Fort Dodge Laboratories, Fort Dodge, Iowa: "Diagnostic Problems."

DR. W. A. AITKIN, Merrill, Iowa: "Hog Cholera Problems" and "Common Diseases of the Hog Other Than Cholera."

DRS. FRANK THORP, JR., R. W. LUECKE (Ph.D.), E. F. STERNER, Ionia, and MR. W. N. McMILLAN: "Swine Nutrition Problems."

DR. W. A. HAGAN, dean, New York State Veterinary College, Cornell University, Ithaca: "The Mexican Foot-and-Mouth Disease Situation."

s/C. H. CUNNINGHAM, *Conference Committee*.

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**Southeastern Society.**—The Southeastern Michigan Veterinary Medical Society met Jan. 12, 1949, at the Herman Kiefer Hospital, Detroit, to discuss and adopt the new constitution and by-laws. Drs. R. C. Klussendorf and B. J. Killham attended the meeting and reported on plans for the AVMA annual meeting in Detroit, July 11-14, 1949. The motion pictures "Valiant Years" and "Partners" were shown.

s/W. N. KONDE, *Secretary*.

## Minnesota

**State Association.**—The fifty-second annual meeting of the Minnesota State Veterinary Medical Society was held Jan. 3-5, 1949, in the Hotel Radisson, Minneapolis. After the address of President R. Fenstermacher, the scientific program was presented.

DR. L. T. RAILSBACK, Ellsworth: "Dystocia in the Sow."

DR. FRANK THORP, JR., research professor, School of Veterinary Medicine, Michigan State College, East Lansing: "Diseases of the Breeding Sheep Flock."

DR. J. E. WILLIAMS, School of Veterinary Medicine, University of Minnesota: "Salmonella Pul-

lorum Variants: Their Relation to the Pullorum Disease Problem."

DR. W. R. KRILL, dean, College of Veterinary Medicine, Ohio State University, Columbus: "Obstetrics in the Bovine."

DR. H. E. KINGMAN, Wyoming Hereford Ranch, Cheyenne: "The Problem of Infertility in the Bull and in the Cow."

MR. R. A. TROVATTEN, commissioner, Department of Agriculture, Dairy, and Food, St. Paul: "Quality Dairy Products and the Veterinarian."

DR. J. T. SCHWAB, state veterinarian, Wisconsin Department of Agriculture, Madison, Wis.: "The Township Plan of Brucellosis Control."

DR. K. W. SMITH, Cole-Smith Veterinary Hospital, Sloux City, Iowa: "Diagnosis of Disease in Small Animals."

DR. A. R. ROSEBERG, Minneapolis: "Endocrines in Small Animal Practice."

DR. W. J. HADLOW, School of Veterinary Medicine, University of Minnesota: "X Disease."

DR. D. B. PALMER, secretary, Veterinary Examining Board, Wayzata: "Veterinary Examining Board."

DR. R. L. WEST, secretary, Livestock Sanitary Board, St. Paul: "Livestock Sanitary Board."

DR. J. N. CAMPBELL, Fairmont: "Report of AVMA Delegate."

DR. L. H. PHIPPS, Winnebago: "Report of Special Delegate to Brucellosis Conference."

Officers elected at this meeting were Drs. C. H. Haggard, Luverne, *president*; L. H. Phipps, Winnebago, *vice-president*; and H. C. H. Kernkamp, University Farm, St. Paul, *secretary-treasurer*.

s/H. C. H. KERNKAMP, *Secretary*.

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**Dr. Fenstermacher Honored.**—At the fifty-second annual meeting of the Minnesota State Veterinary Medical Society in Minneapolis on Jan. 4, 1949, Dr. R. Fenstermacher, St. Paul, received from *The Minneapolis Star and Tribune* an award and an engraved certificate which reads:

In recognition of Leadership in Minnesota. Whereas, Dr. R. Fenstermacher as President of the Minnesota State Veterinary Medical Society has given a service to Minnesota that has added to this state's supremacy as a place in which to live and work, has brought additional respect to his organization, and has enhanced his own prestige as a citizen, *The Minneapolis Star and Tribune* presents to him this Leadership Award.

## Mississippi

**State Association.**—The forty-third annual meeting of the Mississippi State Veterinary Medical Association was held at the Pinehurst Hotel, Laurel, on Jan. 20-21, 1949. After the address of President J. P. Carney, Meridian, the scientific program was presented.

DR. JOE F. KNAPPENBERGER, Ashe Lockhart Inc., Kansas City, Mo.: "General Cattle Diseases" and "Bovine Problems of Interest to the General Practitioner."

DR. R. C. KLUSSENDORF, assistant executive secretary, AVMA, Chicago: "Mastitis and the Practitioner," "Brucellosis Eradication," and "The American Veterinary Medical Association and Its Problems."

DR. LOUIS LEONPACKER, La Fayette, La.: "Veterinary Education in the South."

DR. T. A. SIGLER, Greencastle, Ind.: "Equine Diseases and Operations."

DR. W. M. COFFEE, La Center, Ky.: "Anesthesia and Restraint of Large Animals" and "Uses of Whole Blood and Their Technique." Dr. Coffee also led a discussion on "Topics of Interest to the Practicing Veterinarian."

DR. H. T. CARTRITE, Shreveport, La.: "Toxic Eclampsia."

Officers elected at this meeting were Drs. Ben S. Huston, Laurel, *president*; S. A. Cox, Jackson, *secretary-treasurer*; and Robert H. Stewart, AVMA *delegate*.

s/S. A. Cox, *Secretary*.

### Missouri

**St. Louis Association.**—The Greater St. Louis Veterinary Medical Association met Feb. 4, 1949, at the Ralston Purina Research Building. Speaker of the evening was Dr. Malcolm V. Howell, M.D., research fellow in the Department of Internal Medicine, St. Louis University Group of Hospitals. Dr. Howell discussed "Virus Diseases Common to both Man and Animals."

s/W. C. SCHOFIELD, *Secretary*.

**Kansas City Association.**—At the Jan. 21, 1949, meeting of the Kansas City Veterinary Medical Association, the following officers were installed: Drs. John Haley, Topeka, Kan., *president*; W. W. Wempe, Lawrence, Kan., *vice-president*; and E. L. Mundell, Kansas City, Kan., *secretary-treasurer*.

s/E. L. MUNDELL, *Secretary*.

### New Jersey

**State Association.**—The sixty-fifth annual meeting of the Veterinary Medical Association of New Jersey was held at the Hotel Hildebrecht, Trenton, Feb. 3-4, 1949. President Raymond S. Huff, Newton, opened the scientific program.

DR. JOHN J. DEVINE, South Orange: "The Veterinarian in Public Health."

DR. VICTOR BERLINER (Ph.D.), Ortho Research Foundation, Raritan: "The Practical Application of Certain Endocrines in Veterinary Practice."

DR. SAMUEL F. SCHEIDY, Sharp and Dohme, Inc., Glenolden, Pa.: "What's New in Sulfonamide Therapy."

DR. S. J. ROBERTS, New York State Veterinary College, Cornell University, Ithaca: "Treatment of Sterility in Large Animals with Special Reference to the Sex Hormones."

DR. G. W. RAWSON, Ciba Pharmaceutical Products, Summit: "Allergy and Antihistamine Therapy in Veterinary Practice."

DR. L. M. HURT, Los Angeles, Calif., president of the AVMA: "The AVMA and the Veterinarian's Education."

DR. R. A. KELSER, dean, School of Veterinary Medicine, University of Pennsylvania, Philadelphia: "Biological Warfare Questions Which May Concern Veterinary Medicine."

DR. GEORGE C. POPPENSIEK, Dumont: "Report of AVMA Delegate."

MR. HERALD R. COX (Sc.D), Lederle Laboratories, Pearl River, N. Y.: "Rocky Mountain Spotted Fever" (with illustrations).

DR. DANIEL BERGSMAN (M.D., M.P.H.), state commissioner of health, Trenton: "Public Health and Veterinary Medicine—A Team for Better Health of all New Jerseyans."

DR. CLARENCE P. ZEPP, JR., New York, N. Y.: "Epidural Anesthesia in Small Animals."

DR. H. J. METZGER, Agricultural Experiment Station, New Brunswick: "Vibronic Abortion in Cattle."

DR. RICHARD B. SHOPE (M.D.), Rockefeller Institute, Princeton: "Foot-and-Mouth Disease and Other Cattle Problems Observed on a Recent Trip to Africa."

s/J. R. PORTEUS, *Secretary*.

**Dr. Beaudette Honored.**—Dr. Fred R. Beaudette (KSC '19), New Brunswick, was acclaimed as the world's leading poultry pathologist and was presented with the Golden Egg Award at the annual dinner of the New Jersey State Poultry Association on Jan. 26, 1949, at Trenton. Dr. Beaudette, who for twenty-five years has served on the staff of the New Jersey State University, played a prominent part in identifying the first cases of Newcastle disease (avian pneumoencephalitis) in this country and in developing and perfecting a vaccine for protection against this disease. He has also made significant contributions in combating laryngotracheitis, swine erysipelas in turkeys, and pseudotuberculosis in birds.



Dr. Fred R. Beaudette (left) receives a "Golden Egg" from Dr. R. A. Hendershott, New Jersey 8A1, "for distinguished service to the poultry industry."

In addition to the Golden Egg Award, Dr. Beaudette also received a combination television, radio, and record player and a purse containing several rare bills.

### New York

**New York City Association.**—The Veterinary Medical Association of New York City, Inc., met at the Hotel Statler on Feb. 2, 1949. Dr. J. R. M. Innes, chemical Biological Coordination Center, National Research Council, Washington, D. C., spoke on "Canine Encephalopathies."

s/C. R. SCHROEDER, *Secretary*.

**French Veterinarian Honored.**—Dr. Gaston Léon Ramon (ALF '11), French research veterinarian who has been with the Pasteur Institute since 1911, was selected as an honorary member of the New York Academy of Sciences, for his contributions in the field of preventive medicine. Chief among these was the discovery of anatoxin or toxoid as the result of detoxification of toxins with formalin or some other agents with retention of antigenic properties. This is now being used throughout the world to prevent diphtheria. Dr. Ramon has also worked out the flocculation technique for the

standardization of antitoxic serums and defined the flocculating unit of such serums.

s/C. R. SCHROEDER.

**Few Doped Horses.**—Evidence of doping was found in only 4 out of nearly 8,000 saliva and urine samples examined by the laboratory of the New York State Racing Commission last year (*Blood-Horse*, Jan. 8, 1949). One of the positive samples was from a Thoroughbred, and the other three were from Standardbreds. Morphine found in one of the samples was believed to have come from a liniment used on the horse's legs.

## North Carolina

**State Association.**—The eleventh annual conference for veterinarians was held at the State College, Raleigh, on Jan. 25-28, 1949, with 100 veterinarians in attendance. The following program was presented:

MR. R. S. DEARSTYNE: "The Poultry Industry."

DR. B. F. COX, Baton Rouge, La.: "Common Poultry Diseases."

DR. L. M. GREENE, Millsboro, Del.: "Newcastle Disease in North Carolina."

DR. H. C. SMITH, Sioux City, Iowa: "Swine Brucellosis," "Milk Fever," and "Immunity Studies."

DR. D. H. UDALL, New York State Veterinary College, Cornell University, Ithaca: "Mastitis."

DR. W. MOORE, Department of Agriculture, Raleigh: "Disease Control in North Carolina."

DR. E. L. SHUFORD, Asheville: "Euthanasia in Horses and Mules."

MR. PAUL SWAFFER: "Beef Production in North Carolina."

DR. B. T. SIMMS, U.S., BAI, Washington, D. C.: "Foot-and-Mouth Disease."

DR. D. T. SMITH, M.D., Durham: "Undulant Fever."

DR. J. RAYMOND CURREY, Washington, D. C.: "Canine Diseases."

Governor W. Kerr Scott addressed the members at the banquet.

s/J. H. BROWN, *Secretary*.

## Nova Scotia

**Provincial Association.**—The Nova Scotia Veterinary Association met Sept. 8-9, 1948, at Truro. After the banquet, the films "Sentinels of Milk," "Ye Olde and New in Medical Research," "Battling Brucellosis," and "Tuberculosis in Poultry and Swine" were shown. Officers elected at this meeting were Drs. J. E. Hendry, Halifax, *president*; J. H. Scott, Port Williams, *vice-president*; R. M. Archibald, Truro, *acting secretary*; R. M. Archibald, and V. A. Ellis, Yarmouth, *Executive Board*.

s/E. E. HANCOCK, *Resident Secretary*.

## Ohio

**State Association.**—The sixty-fifth annual meeting of the Ohio State Veterinary Medical Association was held at the Desher-Wallick Hotel in Columbus on Jan. 5-7, 1949, with an attendance of 730. The scientific program followed President G. W. Lies' address.

DR. W. O. BRINKER, School of Veterinary Medicine, Michigan State College, East Lansing: "The Use of the Intramedullary Pin in Fractures."

DR. D. L. COFFIN, the Angell Memorial Animal Hospital, Boston, Mass.: "Infectious Hepatitis and Leptospirosis."

DR. C. D. BARRETT, Akron, was moderator of a panel discussion on "Small Animal Practice

Problems." Other members of the panel were Drs. R. G. Kerans, Cincinnati; V. G. Crago, Youngstown; C. C. Wagner, Cleveland; W. O. Brinker; and D. L. Coffin.

DR. C. R. SMITH: "Normal Physiology of the Reproductive Tract."

DR. T. S. SUTTON: "Nutrition as Related to Reproduction in Dairy Cattle."

DR. C. R. COLE: "Pathological Findings in Sterility."

DR. E. E. CHAMBERS, Rossville, Ga.: "A Practitioner's Methods of Handling Sterility Problems."

DR. W. G. VENZKE: "Hormone Therapy in Sterility."

DR. W. F. GUARD: "Application of Surgical Procedures in Sterility."

DR. W. L. INGALLS: "Newcastle Vaccine: Its Use and Regulations in Ohio."

MR. C. M. FERGUSON, the Ohio Poultry Council: "What the Poultry Industry Expects of the Veterinary Profession."

DR. R. M. HOFFERD, Corn States Serum Co., Cedar Rapids, Iowa: "Swine Practice Problems."

DR. L. M. HURT, Los Angeles, Calif., president of the AVMA: "The Activities of a County Veterinary Inspector."

DR. A. J. CARLSON (M.D.), president, National Society for Medical Research, Chicago, Ill.: "Animal Experimentation."

DR. J. E. PETERMAN, veterinarian in charge, BAI, Lincoln, Neb.: "Swine Erysipelas in Ohio: Determinations of a Recent Survey."

DR. J. H. HELWIG: "Mastitis: Newer Methods of Diagnosis and Treatment."

DR. L. M. HUTCHINGS, Department of Veterinary Science, Purdue University: "Brucellosis in Swine" (with illustrations).

DR. W. D. POUNDEN, Ohio Agricultural Experiment Station, Wooster: "Calfhood Raising Problems."

Drs. Smith, Sutton, Cole, Venzke, Guard, Ingalls, and Helwig are from the faculty of the Department of Veterinary Medicine, the Ohio State University, Columbus.

The motion pictures "A Man's Greatest Friend," "Atomic Power," and "A Man, A Dog, and His Gun" were shown.

The following officers were elected: Drs. R. E. Rebrassier, Columbus, *president*; H. K. Bailey, Wilmington, *president-elect*; S. W. Stout, Hamilton, *vice-president*; J. H. Helwig, Columbus, *treasurer*; F. J. Kingma, Columbus, *secretary*; C. D. Barrett, Akron, *Executive Board member*; C. R. Cole, Columbus, *resident secretary of the AVMA*; F. J. Kingma, *delegate to the House of Representatives of the AVMA*.

s/F. J. KINGMA, *Secretary*.

## Oklahoma

**State Association.**—The thirty-fourth annual meeting of the Oklahoma Veterinary Medical Association was held Jan. 10-11, 1949, in the Skirvin Tower Hotel, Oklahoma City. After the business session, the scientific program was presented.

DR. L. M. HURT, Los Angeles, Calif., president of the AVMA: "AVMA Activities" and "Livestock Disease Control from the Standpoint of County Livestock Department."

DR. H. C. H. KERNKAMP, University Farm, St. Paul, Minn.: "Diseases Affecting Baby Pigs" and "Diseases of Postweaning-Age Pigs."

DR. ED L. TAYLOR, Georgetown, Ky.: "Practical Application of Sulfamoythane" and "Handling of a Thoroughbred Nursery."

DR. JACK C. MILAM (M.D.), Chandler: "Relationship Between the Medical and Veterinary Professions."

DR. W. W. ARMISTEAD, Texas A. & M. College, College Station: "Small Animal Practice" and "Small Animal Surgery."

DR. WENDELL KRULL, Oklahoma A. & M. College, Stillwater: "Liver Flukes of Ruminants."

MR. LEO J. McDONALD, Oklahoma City: "Soil Conservation."

DR. A. EISENSTARK, Oklahoma A. & M. College, Stillwater: "The Nature of Viruses."

Officers elected at this meeting were Drs. E. T. Riley, Hobart, *president*; C. E. Hofmann, Tulsa, *vice-president*; Lewis H. Moe, Stillwater, *secretary-treasurer*; C. H. Fauks, Oklahoma City, *AVMA delegate*; and O. E. Robinson, Bixby, *alternate*.

s/Lewis H. Moe, *Secretary*.

## Ontario

**Provincial Association.**—The seventy-fifth annual meeting of the Ontario Veterinary Association was held Jan. 19-21, 1949, at the Royal Connaught Hotel, Hamilton. After the opening address by President E. F. Johnston, Carp, the scientific program was presented.

DR. RAY WILLKINSON, Kenmore, N. Y.: "Problems in Small Animal Practice."

DR. H. DOWNIE, Guelph: "Some Physiological Aspects of Blood Transfusions."

DRS. C. A. V. BARKER and A. F. BAIN, Guelph: "Vibrionic Abortion of Cattle."

DR. R. A. McINTOSH, Guelph: "Large Animal Clinic Cases" (with illustrations).

DR. THOS. HARPER, Montreal, P. Q.: "Intestinal Obstructions in Dogs."

DR. C. A. MITCHELL, Dominion Animal Pathologist, Department of Agriculture, Hull, Quebec: "The Responsibility of the Veterinary Profession in Relation to the World Food Shortage."

DR. S. F. ROSNER, Allied Laboratories, Kansas City, Mo.: "Swine Diseases."

DR. E. P. LEONARD, New York State Veterinary College, Cornell University, Ithaca, N. Y.: "Abdominal Surgery in the Dog."

DR. ALAN C. SECORD, Toronto, conducted a panel discussion on "Diseases of Small Domestic Animals."

DR. J. L. McAULIFF, Courtland, N. Y.: "The Use of Some of the Newer Therapeutic Agents in Cattle Practice."

DR. J. S. GLOVER, Guelph: "Poultry Disease Problems in Ontario."

By majority vote, the OVA became a constituent part of the newly formed Canadian Veterinary Medical Association.

s/T. L. JONES, *Secretary*.

**New Style of Branding Reactors.**—The instructions issued by Veterinary Director General Childs (see February JOURNAL, p. 109) regarding the new method of branding cattle reactors to brucellosis and tuberculosis is in effect in all the provinces of Canada. Inasmuch as the orders were issued from Ottawa, the capital, the item appeared under Ontario.

## Pennsylvania

**Bucks Montgomery Association.**—The Bucks Montgomery Veterinary Medical Association met Feb. 9, 1949, at the Moose Home in Doylestown. Mr. John Swenk, of the Lehigh Valley Cooperative Farmers, Allentown, spoke on "Artificial Insemination."

s/J. G. SHUTE, *Secretary*.

**Dr. Danks Joins Staff of Veterinary School.**—Dr. A. Gordon Danks (CORN '33), was appointed professor of animal industry at the Veterinary School, and resident manager of the veterinary school's Bolton Farm, University of Pennsylvania, Philadelphia, effective March 1, 1949. Dr. Danks taught at Kansas State

College and at Cornell University, where he was professor of operative, general, and clinical surgery from 1936 to 1947. During 1948, he served as professor and head of the Department of Veterinary Medicine, College of Veterinary Medicine, University of Illinois, Urbana. Dr. Danks has written several publications, the best known of which is the recent revision of "Williams' Surgical Operations."

## Tennessee

**State Association.**—The forty-first annual meeting of the Tennessee Veterinary Medical Association was held at the Maxwell House Hotel, Nashville, Jan. 17-18, 1949. After President W. O. Greene's address, the scientific program was presented.

DR. R. C. KLUSSENDORF, assistant executive secretary, AVMA, Chicago, Ill.: "What's New in Mastitis Control."

DR. JOSEPH S. RUHE, U. S. Public Health Service, Kansas City, Mo.: "Histoplasmosis."

DR. C. E. KORD, state veterinarian, Nashville: "Report from State Veterinarian."

DR. ARTHUR B. CHRISTIAN, Biltmore Dairies, Biltmore, N. Car.: "Dairy Cattle Practices."

DR. B. F. HOERLEIN, associate professor, Alabama Polytechnic Institute, Auburn: "Small Animal Medicine" and "Small Animal Surgery" (with illustrations).

DR. JOE F. KNAPPENBERGER, Ashe Lockhart, Inc., Kansas City, Mo.: "Cattle Practice."

DR. DENNIS SIKES, Department of Veterinary Science, College of Agriculture, University of Tennessee, Knoxville: "Chronic Fluorosis of Domestic Animals."

Drs. B. F. Hoerlein, Joe F. Knappenberger, A. B. Christian, H. W. Hayes, Knoxville, and W. R. Lawrence, Dyersburg, participated in an open panel discussion.

Dr. R. C. Klusendorf broadcast on Noontime Neighbors over WSM on behalf of the TVMA.

Officers elected at this meeting were Drs. W. R. Lawrence, Dyersburg, *president*; H. W. Hayes, Knoxville, *first vice-president*; Fred Schell, Franklin, *second vice-president*; H. W. Nance, Lawrenceburg, *secretary-treasurer*; M. L. Farris, Morristown, *alternate AVMA delegate*; and Dennis Coughlin, Knoxville, *AVMA delegate*.

s/H. W. NANCE, *Secretary*.

**East Society.**—Officers elected at the Dec. 11, 1948, meeting of the East Tennessee Veterinary Medical Society are Drs. M. L. Farris, Morristown, *president*; H. L. Lamb, Athens, *vice-president*; and Dennis Sikes, Knoxville, *secretary-treasurer*.

s/D. COUGHLIN, *Resident Secretary*.

## Texas

**State Association.**—The thirty-seventh annual meeting of the State Veterinary Medical Association of Texas was held in the Texas Hotel, Ft. Worth, on Jan. 17-19, 1949. The scientific program follows.

DR. H. SCHMIDT, School of Veterinary Medicine, College Station: "Disease and Other Developments Observed During the Year."

DR. R. C. DUNN, "X-Ray and Some of Its Uses."

MR. PAUL GREGG, Entomologist, Klaus and White, San Antonio: "External Parasites and the Newer Insecticides."

DRS. R. D. TURK and V. B. ROBINSON: "Laboratory Techniques and Slide Viewer."

DR. MORRIS POLLARD (M.D.), University of

Texas Medical Branch, Galveston: "Discussion of Q Fever."

DR. K. S. YOUNG, U. S. Public Health Service Coordinator, Austin: "Rabies Comments."

DR. L. M. HUTCHINGS, Purdue University, Lafayette, Ind.: "Swine Brucellosis and Its Relationship to Bovine Brucellosis."

DR. H. E. PINKERTON, Fort Dodge Laboratories, Fort Dodge, Iowa: "Immunization of Swine."

DR. W. C. BANKS, Extension Service, College Station: "Extension and Public Relations."

DR. L. C. GRUMBLES, Department of Veterinary Science, Louisiana State University, Baton Rouge: "Respiratory Infections of Poultry."

DR. W. A. BONEY: "Newcastle Diseases and Immunization."

DRS. D. L. CADY, El Paso and R. J. DICKINSON, Dallas: "Small Animal Practice."

DRS. A. A. LENERT, O. E. WOLFE, Big Spring, and G. T. EASLEY, Turner Ranch, Sulphur, Okla.: "General Practice."

Drs. Schmidt, Dunn, Turk, Robinson, Boney, and Lenert are members of the faculty of the School of Veterinary Medicine, Texas A. & M. College, College Station.

Officers elected at this meeting were Drs. R. A. Culpepper, San Antonio, *president*; W. T. Hardy, Sonora, *president-elect*; I. B. Boughton, College Station, *first vice-president*; J. W. Barton, Temple, *second vice-president*; J. D. Williams, Colorado City, *third vice-president*; E. A. Grist, College Station, *secretary*; and E. W. Wupperman, Austin, *treasurer*.

s/LEON G. CLOUD, *Resident Secretary*.

## Utah

**Cattle Losses Investigated.**—The Utah Agricultural Experiment Station has begun studies of 1,900 head of cattle in Wayne County to determine the cause of a disease which causes an annual loss of 2 to 4 per cent of cattle grazing this range. Symptoms are rough coats, enlarged abdomens, variable degrees of anemia, occasionally profuse diarrhea, and rapid loss of weight. Mineral supplements are now being fed in an attempt to determine if the disease is of nutritional origin.—*Am. Hereford J., Jan. 15, 1949.*

## Vermont

**Personal.**—Dr. Robert Arms (MSC '46), Burlington, has accepted an invitation from representative farmers of Randolph and surrounding communities to practice at Randolph. The area had been without a veterinarian since the death of Dr. A. A. Mortimer in December, 1948.

## Washington

**Fellowships Available.**—Assistantships and fellowships are available to qualified graduates of approved colleges and universities in most departments of the schools and colleges within the State College of Washington, Pullman. Stipends vary from \$1,200 to \$2,000 annually depending on amount of service required, extent of training, and other factors. For application forms and other information write Stewart E. Hazlet, dean of the Graduate School, the State College of Washington, Pullman, Wash.

## West Virginia

**State Officers.**—Officers of the West Virginia Veterinary Medical Association are Drs. C.

Frank Hale, Beckley, *president*; W. B. Alfred, Weston, *vice-president*; and R. M. Johnson, Charleston, *secretary-treasurer*.

s/S. E. HERSHEY, *Resident Secretary*.

## Wisconsin

**State Officers.**—Officers elected at the meeting of the Wisconsin State Veterinary Medical Association in January, 1949, were Drs. L. J. Steuber, Prairie du Sac, *president*; R. B. Hipenbecker, Fennimore, *vice-president*; W. L. Richards, Morrisonville, *treasurer*; J. O. McCoy, Reeseville, *secretary*; and J. T. Schwab, Oconomowoc, *AVMA delegate*.

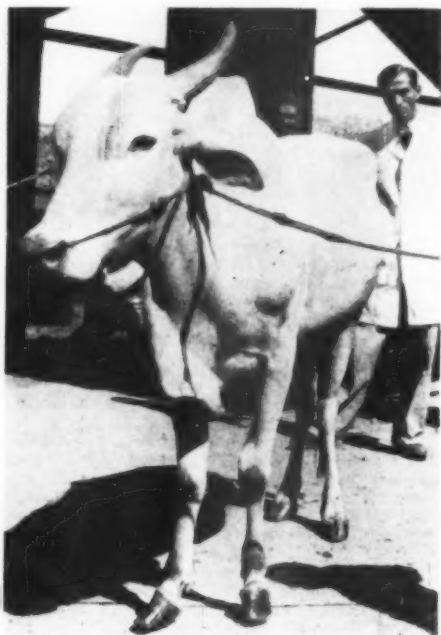
s/J. O. McCoy, *Secretary*.

**Milwaukee Association.**—The monthly meeting of the Milwaukee Veterinary Medical Association was held Jan. 18, 1949, in the Wisconsin Humane Society lecture hall. Dr. John A. Patton, inspector in charge, Milwaukee area, U. S. BAI, spoke on "Experiences as an Army Veterinarian." s/K. G. NICHOLSON, *Secretary*.

## FOREIGN NEWS

### India

**Mule-Footed Zebu Bull.**—C. G. Kale, G.B.V.C. (Ind. Vet. J., March, 1948), described a zebu bull whose fore hoofs are solid and the hind ones cleft. Whatever a dissection of the skeleton would show, the exhibit is an example of



—From the Indian Veterinary Journal  
The fore hoofs of this zebu bull are solid, the hind ones are cleft.



the process of solipedization comparable to that of the horse and the mule-footed hog, and is believed the first to be reported in a polygastric mammal.

### Brazil

**Dr. Cruz Receives Appointment.**—Dr. Paulo Frôes da Cruz (MG '21), former agricultural attaché to the Brazilian embassy in Washington, D. C., from 1941 to 1947, was appointed technical assistant to the secretary of agriculture in Brazil on Jan. 6, 1949.



Dr. Paulo Frôes da Cruz

Dr. Cruz, a member of the AVMA, married the former Miss Marie Agnes Zellers of Washington, Pa. They have a son, born in 1947.

## VETERINARY MILITARY SERVICE

**Reserve Officers Placed on Active Duty.**—The following Veterinary Corps Reserve officers were placed on active duty during February as indicated:

- Wilson O. Boaz, Fort Bliss, Texas.
- William H. Brunn, Presidio of San Francisco, Calif.
- Robert C. Buchwalter, Robin Air Force Base, Ga.
- Eli Gersten, McCormack General Hospital, Calif.
- Ross M. Grey, Ohio Military District, Fort Hayes, Columbus, Ohio.
- Donald A. Henshaw, Chicago Quartermaster Depot, Chicago, Ill.
- Robert H. Hollis, Fort Dix, N. J.
- Kenneth L. Kuttler, Veterinary Div., AMDR&GS, Army Medical Center, Wash., D. C.
- John E. LeJune, Jr., Fort Benjamin Harrison, Ind.
- Merle E. Loller, Chicago Quartermaster Depot, Chicago, Ill.
- Leslie E. Meckstroth, 1100 ASU, HFSC, General Dispensary Army Base, Boston, Mass.
- John F. Moore, Waco Air Force Base, Texas.
- Walter L. Roots, 6901 ASU, San Francisco

Port of Embarkation, Calif.

David S. Sprinkle, Fort Worth Quartermaster Depot, Fort Worth, Texas.

George O. Thomas, 4106 ASU New Orleans Port of Embarkation, La.

The above officers attended the sixty-second class, Meat and Dairy Hygiene School at Chicago, which started Feb. 21, 1949, prior to reporting to their stations.

William H. Schiefelbein, Third Army Area Medical Laboratory, Fort McPherson, Ga., with ten weeks TDY at Army Medical Center, Washington, D. C.

Leland B. Carter, 9182 TSU Quartermaster Corps, Agriculture Remount Service Station, Fort Reno, Okla.

### Veterinary Corps Conserves Air-Lift Space.

With the coordination between Army and Air Force veterinarians at both terminals of the Berlin air-lift, a well-regulated program of food care and handling is in operation. Food inspections assure that only safe, wholesome foods of good quality are presently reaching U. S. personnel and the German population in blockaded Berlin. Perishable foods for the air-lift are screened for condition at the cold storage plant in Frankfurt and again at the Wiesbaden air base. One and a half hours later the food is in Berlin. The elimination of foods that are poorly packaged or deteriorated and the improvisation of special packaging techniques have saved inestimable air transport space. Obviously, air tonnage goals mean little if the food is unsound for human use when it reaches its destination.

Although the Berlin air-lift is the most extensive operation of its kind, the Army veterinary service had opportunity to study, and experience in, the problem of a food air-lift during World War II. These operations involved sudden fluctuations in temperature and lack of adequate refrigeration facilities.

The Berlin air-lift, while having the advantage of being supervised under an intensified program of Army veterinary food control, has resulted in less food loss than was encountered previously with the rail transportation of food to Berlin.

**Colonel Lovell Honored.**—Col. Raymond I. Lovell (CSU '14) port veterinarian, on Jan. 7, 1949, received the Collar Order of Yun Hui, a military decoration of the Chinese National Government, at a special ceremony at Fort Mason.

The award recognizes his meritorious services to China while serving as chief veterinarian for the services of supply of the American and Allied forces in China in 1944 and 1945.

**Colonel Randall Speaks at Sanitation Symposium.**—Colonel Raymond Randall, V.C., (USCVS '17), director of the veterinary division, Army Medical Department Research and Graduate School, Army Medical Center, presented a paper, "The Effect of Freezing on the Stability of Milk Products," at a symposium on recent research in milk and food sanitation at the auditorium of the U. S. Department of Commerce on Jan. 26-27, 1949. Colonel Randall was honored recently by election to the academy of Medicine of Washington, D. C.

## BIRTHS

To Dr. (KSC '43) and Mrs. H. O. Weber, Newington, Conn., on Sept. 13, 1948, a daughter, Dorothea Grayce.

Dr. (ISC '45) and Mrs. Harold E. Bain, Independence, Mo., announce the birth of a daughter, Nancy Jean, on Sept. 27, 1948.

## DEATHS

**G. G. Adams** (CVC '09), East Troy, Wis., died in October, 1948.

★**Ernest F. Ahnert** (UP '15), 59, Los Angeles, Calif., died on Oct. 5, 1948. Dr. Ahnert was admitted to the AVMA in 1940.

**Carlyle E. Bosdale** (GR RAP '17), Reading, Mich., died suddenly on Aug. 30, 1948. Dr. Bosdale had been in general practice.

★**Walter W. Bowman** (KCVC '16), 63, Frederick, Okla., died Jan. 2, 1949, at the home of his daughter in New Orleans. Dr. Bowman had served Tillman County, Okla., for thirty-five years. He was admitted to the AVMA in 1920.

**John M. Brooks** (ONT '11), 64, Saginaw, W. S., Mich., died in May, 1948. Dr. Brooks had been a member of the AVMA.

★**Richard E. Bullock**, (CIN '15), 57, Lebanon, Ohio, died Jan. 30, 1949. Dr. Bullock was admitted to the AVMA in 1928.

★**C. A. Deadman** (GR RAP '03), 66, Madison, Wis., died on Dec. 24, 1948. Starting practice in 1902, he became Madison's oldest veterinarian and through several decades was one of the leading men in his profession. In 1929, he was appointed state veterinarian. In 1930, he was elected alderman and served for eleven years in this capacity. He had been ill for some time before his death, but he did not lose interest in civic affairs. Old-timers and youngsters who valued his stern advice and cheerful philosophies regarded him with something more than liking when he patched up their injured pets. Dr. Deadman was admitted to the AVMA in 1912.

**Clarence M. Downing** (ST. JOS '18), 70, Arkansas City, Kan., died late in 1948. Dr. Downing had been a member of the AVMA.

★**Herman Dykema** (MSC '28), 55, Muskegon, Mich., died of a heart attack on Nov. 27, 1948. Dr. Dykema was a past president of the Michigan State Veterinary Medical Association and had been a member of the AVMA for forty years.

**John R. Hagyard** (ONT '75), 93, Lexington, Ky., died at his home on Nov. 28, 1948. Dr. Hagyard attended many of the well-known Thoroughbreds at Woodburn Farm, Castleton, Walnut Place, and other stables. He was also known as a breeder of Standardbreds. Although he retired from active practice in 1918, Dr. Hagyard continued to answer calls for consultation and to aid in selection of breeding stock until a few years ago.

★**Ross J. Hinkle** (OSU '19), 55, Milwaukee, Wis., died Dec. 24, 1948, of a heart attack. Dr. Hinkle was associated with the Owens Animal

Hospital in Milwaukee from 1930 to 1940, when he established the Small Animal Hospital, Inc. He was admitted in the AVMA in 1946.

★**David C. Hyde** (OSU '10), 67, Columbus, Ohio, died on Dec. 18, 1948. Dr. Hyde had been assistant state veterinarian in Ohio since 1911, and was a member of the AVMA for forty years.

★**Arthur J. Kay** (CVC '17), 54, Frankfort, Ky., died Dec. 15, 1948. Dr. Kay was a member, and past president, of the Kentucky Veterinary Medical Association, a member of the Kentucky Veterinary Medical Examining Board, and of the Executive Board of the KVMA. He was admitted to the AVMA in 1923.

★**Joseph H. Kitzhofer** (OSU '10), 60, Oklahoma City, Okla., died of a heart attack on Nov. 23, 1948. Dr. Kitzhofer became a veterinary inspector in the U. S. BAI in 1913. In 1920, he was made inspector in charge of meat inspection at West Fargo, N. Dak., and in 1932, he was transferred to Oklahoma City, as veterinarian in charge of meat inspection, where he remained until his resignation in May, 1948. Dr. Kitzhofer was also a lecturer on the honorary staff of the Medical School of the Oklahoma State University for twelve years. He served as vice-president of the National Association of Federal Veterinarians, and was elected president of this association in 1946. Dr. Kitzhofer was admitted to the AVMA in 1918.

**John R. Knauf** (GR RAP '99), Cadillac, Mich., died on July 6, 1948. Dr. Knauf had retired some time ago.

**George H. Lasher** (MC K '08), 61, Rutland, Ohio, died on Jan. 6, 1949, while attending the annual meeting of the Ohio State Veterinary Medical Association in Columbus.

**Charles M. Morgan** (ISC '02), Postville, Iowa, died Oct. 13, 1948.

**George W. Noble** (CVC '04), 73, Artesia, Calif., died on Jan. 18, 1949. Dr. Noble practiced at Blanchardville, Wis., from 1904 to 1927; was employed by the Los Angeles (California) County Live Stock Department a short time; and then entered practice in Artesia, where he remained until his death.

★**James A. Ragan** (MC K '00), 76, Morris, Ill., died on Aug. 29, 1948. Dr. Ragan was a member of the AVMA for thirty-nine years.

★**Olin H. Ruddle** (IND '18), 56, Warm Springs, Va., died Dec. 24, 1948. Dr. Ruddle was admitted to the AVMA in 1919.

★**R. R. Schultz** (TH '14), 68, Mt. Vernon, Ind., died on Dec. 8, 1948, after an illness of more than a year. Dr. Schultz had practiced in Mt. Vernon for thirty-five years. He was a member of the Indiana State Veterinary Medical Association and of the AVMA.

★**C. S. Stirrett** (MC K '13), 64, Salisbury, N. Car., died on Jan. 23, 1949. Dr. Stirrett had practiced in Salisbury for twelve years. He was a member of the North Carolina State Veterinary Medical Association and of the AVMA.

**W. E. Wallar** (CVC '18), 74, Mellette, S. Dak., died Jan. 19, 1949, after a lingering illness. Dr. Wallar had practiced for thirty years in Mellette.

**A. E. Zimmer** (OSU '12), Cincinnati, Ohio, died on Dec. 26, 1948.

★Indicates members of the AVMA.



## New VpC Feed Book Ready

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### WRITE

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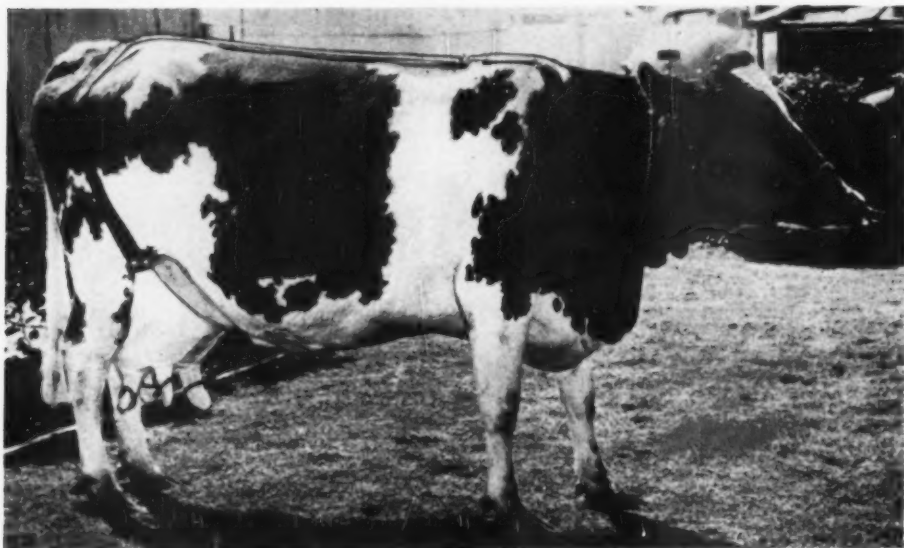
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## COMING MEETINGS

Institute on Public Health Practices for Veterinarians. Sponsored by the Illinois Department of Public Health. Centennial Auditorium, Springfield, Ill., March 21-23, 1949. L. R. Davenport, Division of Communicable Diseases, Department of Public Health, Springfield, Ill.

Maine Veterinary Medical Association. Quarterly meeting. Bangor, Maine, April 13, 1949. S. W. Stiles, Falmouth Foreside, Maine, secretary.

Southeast Missouri Veterinary Medical Association. Spring meeting. Farmington, Mo., April 13, 1949. F. A. Stepp, 405 North St., Sikeston, Mo., secretary.

Iowa, North Central Veterinary Medical Association. Spring meeting. Waukonsa Hotel, Fort Dodge, Iowa, April 21, 1949. B. J. Gray, Fort Dodge, Iowa, secretary.

American Animal Hospital Association. Annual meeting. Edgewater Beach Hotel, Chicago, Ill., May 5-7, 1949. Wayne H. Riser, Box 872, Evanston, Ill., secretary.

Oklahoma State Veterinary Medical Association, summer meeting, and Conference for Veterinarians. School of Veterinary Medicine, Oklahoma A. & M. College, Stillwater, June 6-7, 1949. Lewis H. Moe, School of Veterinary Medicine, Oklahoma A. & M. College, Stillwater, Okla.

Alabama Polytechnic Institute. Annual conference for veterinarians. Alabama Polytechnic Institute, Auburn, Ala., June 7-9, 1949. Dr. J. E. Greene, Cary Hall, A.P.I., Auburn, Ala., chairman.


Texas Veterinary Conference. A. & M. College of Texas. Annual conference. School of Veterinary Medicine, College Station, June 9-10, 1949. R. D. Turk, A. & M. College of Texas, College Station, Texas, chairman.

Georgia State Veterinary Medical Association. Annual meeting. Atlanta Biltmore Hotel, Atlanta, Ga., June 13-14, 1949. Chas. C. Rife, 420 Edgewood Ave., N.E., Atlanta, Ga., secretary.

New York State Veterinary Medical Society. Annual meeting. Pennsylvania Hotel, New York City, June 23-25, 1949. J. S. Halat, 1231 Gray Ave., Utica, N. Y., secretary.

Alberta Veterinary Medical Association. Annual meeting. Calgary, Alta., June 24-25, 1949. J. C. Wainwright, Calgary, Alta., secretary.

(Continued on page 32)



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(Continued from page 30)

North Carolina Veterinary Medical Association. Annual meeting. Carolina Beach, N. Car., June 28-29, 1949. J. H. Brown, Tarboro, N. Car., secretary.

Northwest Veterinary Medical Association (Oregon, Washington, and British Columbia). Annual meeting. Empress Hotel, Victoria, British Columbia, on June 28-30, 1949. F. W. B. Smith, 602 Credit Foncier Bldg., Vancouver, B. C.

American Veterinary Medical Association. Annual convention. Book-Cadillac and Statler Hotels, Detroit, Mich., July 11-14, 1949. J. G. Hardenbergh, American Veterinary Medical Association, 600 S. Michigan Ave., Chicago 5, Ill., executive secretary.

Colorado State Veterinary Medical Association. Annual meeting. Shirley Savoy Hotel, Denver, Colo., Sept. 29-30, 1949. W. P. Blake, 2410 8th Ave., Greeley, Colo., secretary.

Chief Livestock Sanitary Officials. National Assembly. The Neil House, Columbus, Ohio, Oct. 10-11, 1949. Dr. C. F. Clark, State Office Building, Lansing 13, Mich., secretary.

United States Livestock Sanitary Association. Annual meeting. The Neil House, Columbus, Ohio, Oct. 12-14, 1949. Dr. R. A. Hendershott, 1 West State St., Trenton 8, N. J., secretary.

Iowa, Eastern Veterinary Medical Society. Annual meeting. Hotel Montrose, Cedar Rapids, Oct. 20-21, 1949. Laurance P. Scott, P. O. Box 325, Waterloo, Iowa, secretary.

Southern Veterinary Medical Association. Annual meeting. Thomas Jefferson Hotel, Birmingham, Ala., Nov. 7-9, 1949. A. A. Husman, 320 Agricultural Bldg., Raleigh, N. Car., secretary.

\* \* \*

### Regularly Scheduled Meetings

Bay Counties Veterinary Medical Association. the second Tuesday of each month. George E. Martin, 530 Stockton Ave., San José, Calif., secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. Thomas Eville, Route 1, Box 136H, Fresno, Calif., secretary.

Chicago Veterinary Medical Association, the second Tuesday of each month. Robert C. Glover, 1021 Davis St., Evanston, Ill., secretary.

East Bay Veterinary Medical Association, bi-monthly, the fourth Wednesday. O. A. Soave, 5666 Telegraph, Oakland, Calif., secretary.

Greater St. Louis Veterinary Medical Association. Ralston-Purina Research Building, St. Louis, Mo., the first Friday in February, April, June, and November. W. C. Schofield, Dept. of Animal Pathology, Ralston-Purina Co., St. Louis 2, Mo., secretary.

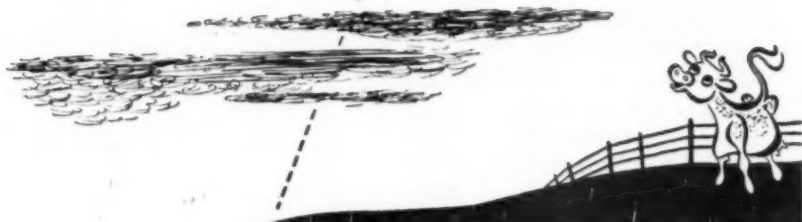
Houston Veterinary Medical Association, Houston, Tex., the first Thursday of each month. Edward Lepon, Houston, Tex., secretary-treasurer.

Illinois Valley Veterinary Medical Association, the second Wednesday of even-numbered

(Continued on page 34)



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\*Casida, McShan and Meyer (1944),  
*J. Animal Sci.*, 3:273, August.

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(Continued from page 32)

- months. R. A. Case, 400 S. Garden St., Peoria, Ill., secretary.
- Indiana Tenth District Veterinary Medical Association, the third Tuesday of each month. J. J. Arnold, Box 144, New Castle, Ind.
- Jefferson County Veterinary Society, Louisville, Ky., the first Wednesday evening of each month. F. M. Kearns, 3622 Frankfort Ave., Louisville 7, Ky., secretary.
- Keystone Veterinary Medical Association. School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pa., the fourth Wednesday of each month. Raymond C. Snyder, N. W. Cor. Walnut St. and Copley Rd., Upper Darby, Pa., secretary.
- Massachusetts Veterinary Association. Hotel Statler, Boston, Mass., the fourth Wednesday of each month. C. L. Blakely, Angell Memorial Animal Hospital, 180 Longwood Ave., Boston, Mass., secretary-treasurer.
- Michiana Veterinary Medical Association, Hotel Elkhart, Elkhart, Ind., the second Thursday of each month, at 7 p.m. Maurice Court, Marcellus, Mich., secretary.
- Michigan, Southeastern Veterinary Medical Society. Herman Kiefer Hospital, Detroit, Mich., the second Wednesday of each month from October through May.
- Milwaukee Veterinary Medical Association. Wisconsin Humane Society, 4150 N. Humbolt Ave., Milwaukee, Wis., the third Tuesday of each month. Kenneth G. Nicholson, 2161 N. Farwell Ave., Milwaukee, Wis., secretary.
- New York City Veterinary Medical Association. Hotel Pennsylvania, New York, N. Y., the first Wednesday of each month. C. R. Schroeder, Lederle Laboratories, Inc., Pearl River, N. Y., secretary.
- Northern San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month. I. N. Bohlender, Box 588, Turlock, Calif., secretary.
- Orange Belt Veterinary Medical Association, the second Monday of each month. James R. Ketchersid, 666 East Highland Avenue, San Bernardino, Calif., secretary.
- Peninsula Veterinary Medical Association, the third Monday of each month. E. W. Paul, Box 866, Redwood City, Calif., secretary.
- Redwood Empire Veterinary Medical Association, the second Tuesday of every other month. Charles D. Stafford, Novato, Calif., secretary.
- Sacramento Valley Veterinary Medical Association, the fourth Friday of each month. R. C. Goulding, 11511 Capitol Avenue, Sacramento, Calif., secretary.
- San Diego County Veterinary Medical Association, the third Tuesday of each month. Mitchell Smith, 3740 Roscerans Boulevard, San Diego, Calif., secretary.
- Southern California Veterinary Medical Association, the third Wednesday of each month. H. I. Ott, 10326 East Artesia Blvd., Bellflower, Calif., secretary.

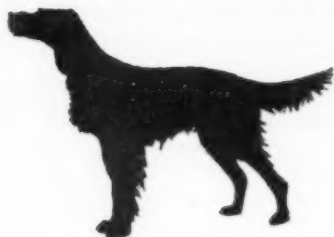
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(Continued on page 48)

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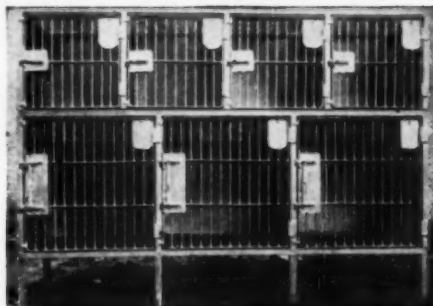
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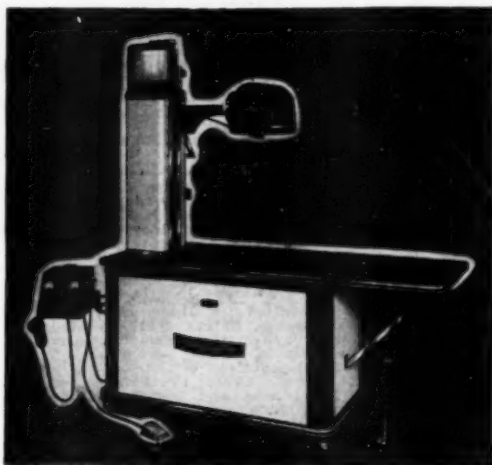
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(Continued on page 40)

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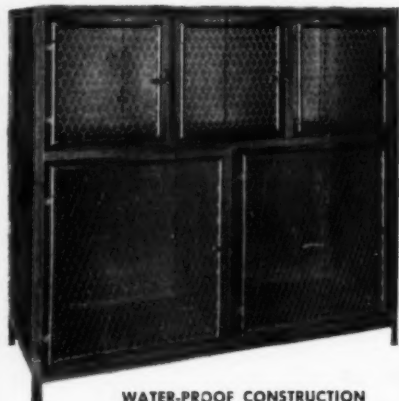


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(Continued from page 38)

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### Wanted—Veterinarians

Assistant veterinarian wanted in a midwestern town. Mixed practice. Good salary. Car furnished if necessary. Address "Box E 4," c/o Journal of the AVMA.

Small town in Indiana greatly in need of veterinarian. Challenge and unusual opportunities for ambitious man. Address Mr. Cliff Baughman, Baughman's Store, Royal Center, Indiana.

Veterinarian wanted to operate small animal hospital in northwestern Indiana. Neatness, integrity, and initiative necessary. Small modern apartment available. State age, experience, other details in first letter. Enclose photograph. Address "Box E 6," c/o Journal of the AVMA.

Veterinarian as night interne, 8 p.m. to 8 a.m. Very little to do but must stay on premises. \$200.00 month and furnished apartment included. Address Box 543, Sanford, Florida.

Small animal veterinarian wanted. Licensed Connecticut and New York. Good position immediately. Address "Box E 2," c/o Journal of the AVMA.

Graduate assistant for exclusive small animal practice. Excellent opportunity for advancement. Write, giving complete history and recent photograph, to Dr. H. T. Rose, Darien, Connecticut.

WANTED—Pathologist with background in vaccine production and diagnostic laboratory work. Also pathologist with poultry experience. Send full information including education background and experience in first letter. Include photograph. Address P. O. Box 2821, Little Rock, Arkansas.

Have opening for associate on staff of large small animal hospital; also opportunity to do some large animal practice. State age, weight, religion, nationality, and marital status. Include brief history of experience, snapshot, and salary expected. Address Dr. R. A. Self, 800 N. Oak Cliff Boulevard, Dallas 11, Texas.

### For Sale or Lease—Practices

FOR SALE—Small animal hospital in south Florida. Accommodates 55 dogs. Modern equipment. 10,000 dairy cattle within 15-mile radius, one horse track and one dog track. Address "Box E 1," c/o Journal of the AVMA.

FOR SALE—General practice eastern New York state. Drugs, x-ray, instruments, supplies, refrigerator, and laboratory equipment. State testing. Priced low, not inflationary. Why not inquire? Address "Box E 3," c/o Journal of the AVMA.

### Miscellaneous

Wanted—Second hand Spencer No. 33 type microscope with low high, and oil-immersion objectives. Address E. S. Scobell, 408 Pammel Court, Ames, Iowa.

### Books and Magazines

KENNEL BLANKS—pedigree, boarding, leasing, training, bookkeeping—send 50c for complete set samples. Keep up on dogs—Dog World 33 yr., \$5. 2 yrs. Judy Publishing Co., 3323 Michigan Blvd., Chicago 16, Ill.

### For Sale—Artificial Insemination Supplies

ARTIFICIAL INSEMINATION INSTRUMENTS—Essential equipment, replacement parts and materials, designed and manufactured especially for artificial insemination. Prompt delivery. New catalog. Address: Breeder's Equipment Co., Flourtown, Pa.

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HEMORRHAGIC SEPTICEMIA  
FOOT ROT**

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**MERAMETH** Sterile Solution may be injected intravenously, intramuscularly, intraperitoneally, or subcutaneously. It also may be administered by intramammary infusion for the treatment of mastitis.

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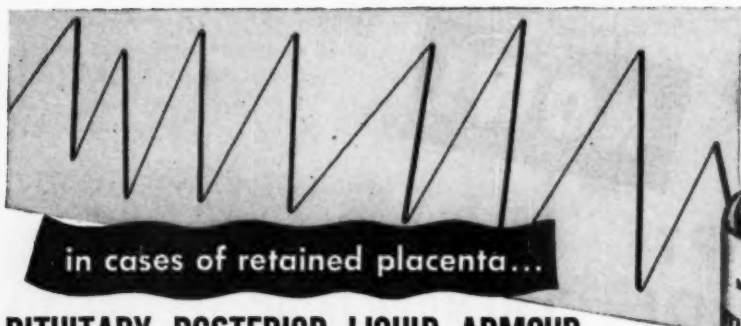
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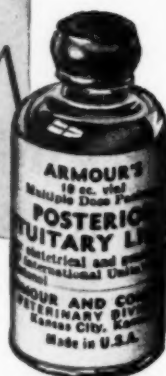
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# HOTEL RESERVATIONS — DETROIT SESSION

Eighty-Sixth Annual Meeting, American Veterinary Medical Association

July 11-14, 1949

All requests for rooms will be handled directly by the various hotels. An ample number of rooms of all types has been assured but the deadline for reservations against the number allotted for the AVMA Convention is 30 days prior to the dates of the meeting. Therefore, your request for accommodations should be sent in before June 10, 1949.

Be sure to indicate your first, second, and third choice hotel. *Date and time of arrival must be given, also date of expected departure.*

Address your request to the hotel of first choice; if this hotel cannot accommodate you, it will be referred to the Detroit Convention and Tourist Bureau which will then pass it on to the hotel of your next choice. You will receive a confirmation of your reservation directly from the hotel.

The Book Cadillac and Statler Hotels will serve as Joint Headquarters and each has allotted a good number of rooms for the AVMA Convention. However, these two hotels will not be able to meet all requests and, therefore, four other near-by hotels have been listed, giving a good range of accommodations and rates. All are first-class, and the locations of them are shown on the map on the opposite page.

*The number of single rooms is limited and double occupancy is urged for as many as possible.*

## Schedule of Hotel Rates—See Locations on Opposite Page

Hotel	Single	Double Bed	Twin Beds	Suites
Book-Cadillac (Headquarters Hotel) 1114 Washington Blvd.	\$3.50 up	\$7.00 up	\$7.00 up	\$15.00-\$32.00
Statler (Headquarters Hotel) 1539 Washington Blvd.	\$3.50 up	\$6.50 up	\$7.50 up	\$13.50-\$25.00
Detroit Leland 1701 Cass St.	\$3.75 up	\$6.25 up	\$7.00 up	"
Fort Shelby 525 W. Lafayette St.	\$3.50 up	\$6.00 up	\$6.50 up	"
Tuller 521 Park Ave.	\$2.75 up	\$5.00 up	\$6.00 up	"
Wolverine 50 E. Elizabeth St.	\$2.75 up	\$5.00 up	\$7.00 up	"

\*Inquire direct to hotel for rate and availability of suites.

----- Cut Off Here -----

## HOTEL RESERVATION FORM—AVMA CONVENTION

(Please type or print)

To: Hotel (name)..... Date .....

Address .....

Detroit, Mich.

Please make reservations noted below:

First choice Hotel.....	Accommodations and Rate Desired
Second choice Hotel.....	Single Room ..... Rate.....
Third choice Hotel.....	Double Room ..... Rate.....
	Twin Bed Room..... Rate.....
	Parlor Suite ..... Rate.....
	Two Bedroom Suite..... Rate.....
	Other (specify) ..... Rate.....

Arriving on (date)..... at ..... a.m. .... p.m.

Leaving on (date)..... at ..... a.m. .... p.m.

Room will be occupied by:

Name ..... Address .....

Name ..... Address .....

Name ..... Address .....

Name ..... Address .....

I understand that, if the hotel of first choice to which this request is addressed cannot furnish the accommodations desired, it will be referred promptly to the Detroit Convention Bureau for attention.

Signed .....

Street Address .....

City ..... Zone ..... State .....

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*In the Mail.*—Letter received by State  
Veterinarian F. X. McArthur, Boise, Idaho.

State Veterinarian

Boise, Ida.

Dear Sir:

This tip of the tongue of a live well Pack  
mule; Breth stunk and tongue broke off by a  
little pull. I was stund for it seemed a mouth  
Disease and yet the sharp beards of grass are  
showing more and more. Hope it is none of  
the Dread Mouth & hoof. Give me your find-  
ings and I hope its grass barb.

The pack animals have been on mountain  
grass with only wild game to contaminate the  
feed. It seems impossible yet it was tragedy,  
so I did not loose time in getting this into  
you for the facts. I think for sure now its  
grass barbs that has done the terrible tragedy.

Sincerely wait and hope to know.

Cerebral  
palsy makes  
little Linda's  
legs unsteady,  
but with the  
aid of a spe-  
cial walker,  
she's learning  
to take her  
first steps.  
Purchase Eas-  
ter Seals and  
give crippled  
children a  
chance to  
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30 Grains	
250 Bulk	\$ 20.00
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1,000 Bulk	60.00
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250 Bulk	\$ 35.00
500 Bulk	60.00
1,000 Bulk	115.00

### BI-SULFA BOLUSES

(Sulfanilamide 120 gr. and Sulfathiazole 120 gr.)	
100 (Boxes of 50)	\$ 15.50
500 " " "	65.00
1,000 " " "	115.00

### TRIPLE SULFA BOLUSES

(Sulfamerazine 60 gr., Sulfathiazole 90 gr. and Sulfanilamide 90 gr.)	
100 (Boxes of 50)	\$ 22.00
500 " " "	100.00
1,000 " " "	190.00

### SULFATHIAZOLE BOLUSES

240 Grains	
100 (Boxes of 50)	\$ 16.50
500 " " "	75.00
1,000 " " "	148.00

### SULFATHIAZOLE TABLETS

40 Grains	
500 Bulk	\$ 23.00
1,000 Bulk	43.00
5,000 Bulk	195.00
30 Grains	
1,000 Bulk	\$ 23.00
5,000 Bulk	105.00

### SULFANILAMIDE BOLUSES

240 Grains	
100 (Boxes of 50)	\$ 8.00
500 " " "	35.00
1,000 " " "	68.00

### SULFANILAMIDE TABLETS

40 Grains	
500 Bulk	\$ 9.00
1,000 Bulk	16.50
5,000 Bulk	75.00
30 Grains	
1,000 Bulk	9.00
5,000 Bulk	40.00

### TRIPLE SULFA TABLETS

(Sulfamerazine 2 1/2 gr., Sulfathiazole 2 1/2 gr. and Sulfanilamide 2 1/2 gr.)	
1,000 Bulk	\$ 15.00
5,000 Bulk	65.00

### SULFA-UREA BOLUSES

(Urea 207 gr., Sulfanilamide 33 gr. and Sulfathiazole 5 gr.)	
100 (Boxes of 50)	\$ 6.00
500 " " "	25.00

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### Veterinary Division

**Measles Starts Meat Inspection.**—Cysticercosis (= measles) in the fourteenth century brought about the passage of a municipal ordinance on meat inspection in Paris. The date of its passage was Nov. 23, 1375. In February, 1587, under Henri III, meat inspection of small animals, game, and fowl was placed in the hands of master cooks; the inspection of cattle, sheep, and swine in those of the butchers. The stated objects of these measures, as at the present time, was the combined protection of the public health and commercial interests.

**World's Poultry Congress.**—Of the 127 papers scheduled for the eighth World's Poultry Congress to be held at Copenhagen Aug. 20-27, 1949, 34 are from the United States, 26 from England, 10 from France, 8 from Canada, 8 from Poland, and the rest from scattered countries.

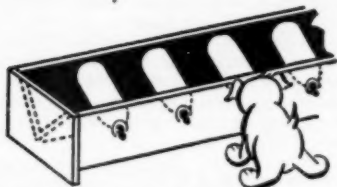
A case is pending in the Minnesota courts to decide the legality of the ruling of the State Board of Pharmacy restricting the sale of vitamins to drug stores—*Drug Topics*.



# For critical periods in canine life...

## BORDEN'S ESBILAC

### Simulated bitch's milk—original formula 107A



**1. FOR ORPHANED PUPPIES.** With Esbilac, you may expect the same results you would get by having an adequate supply of normal bitch's milk, since it closely resembles bitch's milk in all its nutritive values.



**2. FOR PREGNANT OR LACTATING BITCHES.** Fed as a supplement to the bitch's regular food, Esbilac supplies extra fats, carbohydrates, proteins, minerals, and vitamins. It helps produce live, healthy litters, aid normal lactation and bring the mother back to condition quickly.

**3. FOR SICK, CONVALESCENT OR AGING DOGS.** Esbilac supplies the patient's nutritional needs in concentrated form. Digests easily. May be fed as a supplement or as a liquid formula. Used in many kennels and canine hospitals for 10 years or more.



In fact, if infants' needs were the same as puppies', Esbilac could be fed to them. It is carefully formulated from the highest quality ingredients and has all the vitamins and minerals and other nutrients to make it a complete food. Write for full information and simple feeding directions.



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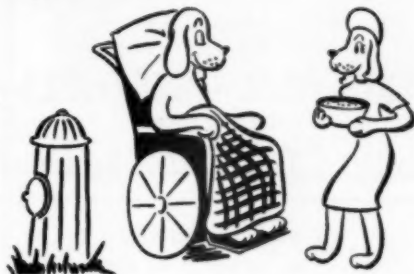
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#### and for healthy dogs... feed **BORDEN'S ARMSTRONG DOG FOOD!**

The same scientists who developed Esbilac and many special foods in both the human and animal field are responsible for Borden's Armstrong Dog Meal and Pellets.

It's a complete dry food, balanced in the necessary protein amino acids, vitamins, minerals and other essential factors. It is highly palatable, economical and easy to feed.

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This annual publication supplements the *Veterinary Bulletin*. It provides a cumulative index of veterinary literature from 1933 onwards. About 10,000 titles are indexed each year, each title being fully cross-referenced alphabetically under both subject and name of author.

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(Continued from page 34)

land, Feb. 2-22, 1949. Mr. Harold J. Coolidge, 2101 Constitution Ave., Washington 25, D. C., executive secretary.

Fifth International Congress of Comparative Pathology. Istanbul, Turkey, May 17-20, 1949. Dr. Louis Grollet, 7 rue Gustave Naduad, Paris 16 e, France, general secretary of permanent committee.

National Veterinary Medical Association of Great Britain and Ireland. London, England, Aug. 12-15, 1949. F. Knight, General secretary, 36, Gordon Square, London, W.C.1.

Fourteenth International Veterinary Congress. London, England, Aug. 8-13, 1949.

*General Secretary, Permanent Committee:* Prof. L. de Bleeck, Kwartellaan 51, The Hague, Netherlands.

*General Secretary, Organizing Committee:* Mr. W. G. R. Oates, 9 Red Lion Square, London, W. C. 1, England

*Secretary, United States Committee:* J. G. Hardenbergh, 600 S. Michigan Ave., Chicago 5, Ill. (Applications for membership from veterinarians in the United States may be obtained by writing to Dr. Hardenbergh.)

**Dog Stamp.**—An attempt to win approval for a postage stamp honoring "Man's best friend" will be made in the 81st U. S. Congress, now in session. Its official release would coincide with National Dog Week of either 1949 or 1950.

The adoption of an official state dog is being considered by some of the states—the Chihuahua for Texas, Beagle for Georgia, Chesapeake Bay Retriever for Maryland, and Scotch Collie for Wyoming.

As the JOURNAL has long observed, the veterinarian is a superscout. He noses into the farmers' affairs *ex necessitate rei* in the line of duty and, in spite of himself, gathers a lot of information that the breeders could put to good use.—*Talliremal*.

**Overused and Impotent.**—Very, greatly, and highly in veterinary writing are good fillers for the column of no-account words. Intended to mean much, they come to mean nothing. Next-of-kin are largely, strongly, extremely, immensely, and extensively. Strong adjectives can make weak adverbs.

Nearly 250,000 dairy herds, with nearly 750,000 cows, were enrolled in artificial breeding associations at the close of 1947—an increase of 60 per cent over 1946.—*USDA Clip Sheet*.

## Notice to Contributors

*Journal of the AVMA*  
and the  
*American Journal of Veterinary  
Research*

**Exclusive Publication.**—Articles submitted for publication are accepted with the understanding that they are not submitted to other journals.

**Manuscripts.**—Manuscripts must be typewritten, double-spaced, and the original, not the carbon copy, submitted. One-inch margins should be allowed on the sides, with 2 in. at top and bottom. Articles should be concise and to the point. Short, simple sentences are clearer and more forceful than long, complex ones. Footnotes and bibliographies also should be typed double space and should be prepared in the following style: name of author, title of article, name of periodical with volume, month (day of month, if weekly), and year.

**Illustrations.**—Photographs should be furnished in glossy prints, and of a size that will fit into the Journals with a minimum of reduction. Photomicrographs which cannot be reduced should be marked for cropping to 1-column or 2-column width. Drawings should be made clearly and accurately in India ink on white paper. Figures appearing on graphs or charts should be large enough to allow for reduction necessary for the chart or graph to fit on Journal pages. All illustrations should bear the name of the author on the back.

**Tables.**—Tables should be simple. Complex tables are not conducive to perusal. It is wiser to summarize complex material rather than to attempt to tabulate it.

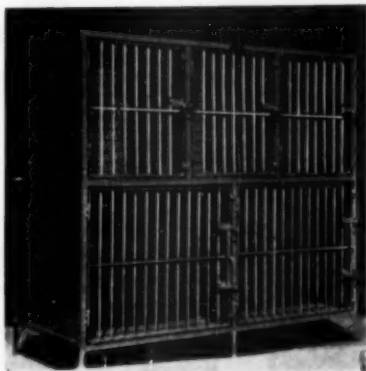
**News.**—Secretaries of associations and readers are requested to send us announcements of meetings and news items.

**Anonymous Letters.**—Anonymous communications, of whatever nature or purpose, to the JOURNAL or to the Association will not be published or referred for consideration to any Association official or committee.

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- No cracks on inside of cage.
- Easy to clean and keep sanitary.
- Booklet illustrates construction.
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Write for booklet.

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has been modernized by the use of tannalbin

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Tannalbin .....	25 gr.
Sulfathiazole .....	25 gr.

Sulfathiazole acts systemically as well as  
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Supplied in:

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for controlling intestinal upsets  
characterized by diarrhea in  
DOGS and CATS.

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